TELECOMMUNICATION REGULATION

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Abstract

Telecommunications has gained in importance in the world economy. Regulation of this industry therefore has become a crucial policy issue of the governments around the world. In the thesis, I examine regulation of telecommunications services in OECD countries. Special attention is given to the New Zealand regulatory regimes before and after the second regulatory reform. As the first regulatory reform in telecommunications in New Zealand occurred over a decade ago, regulatory measures had to be adjusted to suit the current environment. This was the main reason for the establishment of a government-mandated inquiry. Measures were sought and evaluated to reduce or eliminate problems that were associated with the old regime, especially the not-very-productive commercial negotiations and the not-very-efficient process and the institution that operators relied on for solving their disputes. I use Coase Theorem to examine why commercial negotiations did not work as effectively as the government envisaged. With the adjustments of regulatory institutions and their functions, the government wishes to counter the time-consuming dispute resolution process that works against new entrants, and to increase the incentive to negotiate. The second regulatory reform shifted the regulatory burden from the courts to the industry and the Commerce Commission. Comparisons of the two regimes are made to analyse the differences of the two regimes to achieve better understanding of the social and economic goals of the New Zealand government. The two regimes are evaluated to provide information on the potential problems that might emerge in the future. Topics such as the difficulties a regulator faces in imposing appropriate regulatory measures, the direct relationships of regulation and competition and the indirect relationships of regulation and telecommunications

performance are analysed in depth.

Chapter 1

Introduction

Telecommunications can be broadly defined as communications by satellite, cable, telegraph, telephone, radio or television. However, to simplify and limit the scope of the discussions, "telecommunications" will refer to communications by telephone network throughout the paper.

The telecommunications sector has gone through a period of deregulation since 1980s in many countries. The goal of the deregulation of the non-natural monopoly segments of the telecommunications services has been to enhance competition. However, due to the specificity and complexity of the industry, the incumbents have had enough market power to deter entry, and to engage in anti-competitive business practices. The incumbent has the potential and the incentive to make competition as empty as mere words without proper constraints imposed by the regulator. This has been a serious problem especially when the incumbents were usually state-owned monopolies with 100 % market share at the beginning of the liberalisation phase. Denying the entrants' access to the incumbent's local loop that connects to the end-users can virtually wipe out all

competitors at the time when wiring up the basic network infrastructure is extremely costly. Technological innovations such as fibre optics have enabled the entrants to build their own local exchanges with partial coverage that encompasses the most profitable routes. However, as long as the competitors cannot build full-coverage local networks, the interconnection problem will remain a crucial regulatory issue. It may be economically undesirable to wire up a full coverage network because of the inefficiency caused by excess capital investment, which produces excess capacity compared to the consumer demand. Therefore, the regulatory authority should at least establish the entrants' right to interconnect before the commercial negotiations can proceed. The predatory pricing practice in the final service market is a common worry for the regulator as well. The essentiality of the interconnection gives the incumbent more tools to play rough. Therefore, the prices that the incumbent can charge for terminating calls and for final telephone services are often dealt with by means of variant price regulations. However, the interconnection problem is not just about prices, and issues such as number portability can have significant impact on competition.

The term "interconnection" is defined by the Organisation for Economic Cooperation and Development (OECD) as "the way which networks are connected to allow traffic to pass between them including the conveyance of traffic on the network of one carrier on behalf of another carrier or service provider". It encompasses the direction and the symmetry of traffic. The direction of traffic refers to the origination and the termination of calls. The symmetry refers to the nature of interconnection; the connection of two bottlenecks (bilateral or two-way interconnection) or the connection between a bottleneck and a non-bottleneck (unilateral or one-way interconnection). On the physical level, it

includes linkages between and among various entities and industries. In telephone networks, the physical interconnection can be found between the incumbent and new local telephone companies, traditional and competing long distance carriers, mobile carriers and their access to spectrum, domestic and international carriers, dedicated "private" networks of organisations and user groups and internet backbones. The local exchange carrier (LEC) has been the most prominent and sole supplier of the access (to the end-users) services in the past, and it continues to be that in most OECD countries. Fibre optics, wireless technology and digital electronics have enabled competitors to enter the local exchange market in more profitable routes. This has accelerated competition in the "last mile". Although, in most cases the impact on market structure of more competitors entering the local exchange market is not obvious.

This thesis is structured as follows. Chapter 2 is a review of relevant literature addressing interconnection issues in telecommunications. It is separated into four sections. The first section covers the price regulation for retail services. The second section reviews pricing principles of interconnection that are relevant in New Zealand. The third section relates to the regulatory reform. The fourth section concerns the creation of competition. Chapter 3 outlines the basic interconnection problem. It explains why regulatory intervention is necessary in creating effective competition. Chapter 4 examines how the regulatory environment and the scope of market liberalisation affect telecommunications performance such as price, quality and productivity. Chapter 5 provides an overview and details of the regulatory settings of OECD member countries to complement the numerical analysis in Chapter 4. Chapter 6 describes the state of the New Zealand telecommunications industry, including its current industry structure

and the governing laws and institutions of the industry. The Ministerial Inquiry, the government's decisions concerning the Inquiry's recommendations, the introduction of the Telecommunications Act and its passage will be briefly recounted. Chapter 7 is a simple analysis of why the original light-handed regulatory regime that was based on voluntary negotiations would not work in New Zealand. The analysis is focused on the incumbent's incentive to negotiate. The violation of some assumptions of the Coase theory will provide insights into why the voluntary negotiations fail to deliver results in a fair and timely fashion. In Chapter 8, I describe and compare the regulatory regimes resulting from the first and second regulatory reforms in telecommunications in New Zealand. For simplicity, I will call the regulatory regime resulting from the first reform "the old regime" and from the second reform "the new regime". The problems of the old regime and potential problems that might face the new regime are also analysed in Chapter 8 based on what happened in New Zealand in the past decade and on regulation theory. Chapter 9 concludes and offers areas of future research.

Chapter 2

Literature Review

The literature review in this chapter consists of four parts. The first and second parts are related to the regulation of retail prices and interconnection prices. In the first part, traditional rate-of-return and some popular forms of incentive regulation literature is reviewed. The second part of the literature review relates to interconnection pricing rules and principles that are relevant in New Zealand. Before the passage of the Telecommunications Bill 2001 (the old regulatory regime), the highest court in New Zealand upheld the efficient component pricing rule (ECPR) for setting interconnection charges. With the passage of the Telecommunications Bill (the new regulatory regime), if commercial negotiations fall apart, the Telecommunications Commissioner can apply either the cost-based total service long-run incremental cost (TSLRIC) or bill and keep if appropriate to resolve pricing disputes. Literature related to the three pricing principles is thus explored here. Although price regulation is not a permanent feature in the New Zealand regulatory regime, its application is quite common among OECD countries as a means to control the incumbent's or the dominant operator's market power and to en-

hance social welfare. Twenty-six out of twenty-seven OECD member countries regulate retail prices and nineteen out of twenty-four countries regulate interconnection prices for basic voice services (long-distance communications domestic and international). It is believed that price regulation is a useful tool in fostering competition, especially when competition has just been initiated.

The third part of the literature review is related to issues of regulatory reform. Issues of regulatory reform may include the design of the legal environment; the use and application of regulatory instruments; the works of governing institutions; the setup of codes for industry self regulatory activities and the assessment of regulatory regimes by their ability to achieve pre-defined goals, etc. However, I will limit the scope of the literature review to discussions on different regulatory regimes, especially those among the OECD countries. At least two economic factors contributed to the reform movement in the 1980s and 1990s. First, there was a growing awareness of the inefficiency of the incumbent monopolists. Second, technological change created a force toward deregulation. Regulatory reform is not just institutional, it is also about the change to how both the regulators and regulated carriers interact. The regulatory reform emphasises the importance of economic incentives. Therefore, it is not a strict form of regulation. By aligning the interests of regulators and regulated firms, the goals of government can be achieved with fewer administrative costs.

The fourth part of the literature review is related to competition matters. I will review literature which summarises the challenge facing the regulators in promoting competition and the factors that influence how quickly facilities-based competition emerges. Due to the fact that deregulation movement and hence the accomplished regulatory

reform were aimed at promoting and maintaining effective competition, understanding the problem of creating effective competition can get us insights on what regulatory measures should be applied and of what we should be aware when designing the proper regulation structure with respect to instruments.

2.1 Retail Price Regulation

The deregulation in telecommunication markets around the world has led to the privitisation of the previously state-owned enterprises and the abolition of entry barriers. However, in most countries, the government has been reluctant to hand over all controls and give the market free rein. Measures to control telecommunications market, such as licensing requirements, price regulation and disclosure of information on interconnection agreements, are commonplace (Min 2000, Gonenc, Maher and Nicoletti 2000, Boylaud and Nicoletti 2000). Price regulation, which has been widely applied to telecommunications services, puts limits on the price a network operator can charge for its interconnection and/or retail services. The regulatory reform presents a whole new regulation epoch. The traditional rate-of-return price regulation is gradually replaced by incentive based price regulation such as price caps.

The United States is a leading character in telecommunications deregulation. Accordingly, it is also the leading character in implementing price regulation in its various forms. Many discussions on price regulation are therefore based on the experience of the United States (Einhorn 1991, Sappington and Weisman 1996, Vogelsang and Mitchell 1997). Cost-based (also called "cost-plus" or "rate-of-return") price regulation has been the dominant method of price regulation for many years. However, this method evokes

much dissatisfaction among both regulators and academics. Under cost-based price regulation, prices are designed to recover the cost of the regulated firms plus an allowed rate of return on the full value of their capital. Therefore it is focused on establishing a reasonable limit on a network operator's profits. Such system provides only limited incentive for cost reduction effort and the introduction of new services (Einhorn 1991, Sappington and Weisman 1996, and Church and Ware, 2000). Owing to their full cost-recovery nature, the regulated monopolies have little incentive to manage inputs efficiently or to adopt cost-reducing innovations (Einhorn, 1991). Because the regulators will base allowed prices on the reported cost data, regulated carriers would have strong incentives to misrepresent their reported cost data to get higher prices or rate of return (Einhorn, 1991). The tendency for a regulated firm to misrepresent cost data in the reports make it impossible for regulators to regulate prices effectively. Therefore, the social welfare will be reduced as a consequence. Under rate-of-return price regulation, there is a potential for the regulated firms to expand their capital uneconomically. However, on the good side, it provides assurance to firms that their investments in sunk facilities could be recovered. The certainty of being able to recover the cost of investments can encourage timely investments. Furthermore its process is well understood and provides for public input and participation (Church and Ware, 2000).

Today, alternatives to rate-of-return price regulation are commonplace. These alternatives exist in different forms and are generally called *incentive regulation.* The incentive-based regulation is used as a means to encourage efficiency, protect consumer welfare, stimulate technological innovation and reduce administrative costs. The experiments on incentive regulation are often a result of dissatisfaction with the outcome

under cost-based price regulation, especially the lack of incentive for cost minimisation (Church and Ware, 2000). Many variants of incentive regulation have been extensively adopted in the United States and many other countries. Price cap, earnings sharing and revenue sharing are arguably the most popular forms of incentive regulation.

The central idea behind price cap regulation is to control the prices charged by the regulated firm, rather than its earnings (Sappington and Weisman, 1996). Price cap mechanism includes the following features (Acton and Vogelsang, 1989): The price ceilings are imposed on each product of a regulated firm and the firm can charge any price below the ceiling. The price ceiling need not be product specific. An average price ceiling can be applied to a basket of goods, which gives companies the freedom to set the relative prices of their products. The feasibility for a regulated firm to charge relative prices for its product provides room for cross-subsidisation. The price ceiling is adjusted in the short run by using a formula that accounts for both inflation and expected productivity. In essence, price cap regulation plans require the regulated firm's average real prices to fall annually by a specified percentage. This percentage is commonly referred to as the X-factor. The X-factor represents the percentage reduction in prices that the firm is deemed capable of implementing without jeopardising its financial integrity (Sappington and Weisman, 1996); In the long run the price cap is periodically reviewed and updated. The price cap provides high powered incentives and delivers reasonably good performance if the conditions are static and the regulator is well informed. However, the performance of a price cap is not so desirable in a dynamic and uncertain world. When prices do not track costs, price cap results in allocative inefficiency (Church and Ware, 2000). Concerns have been expressed that the incentive for cost minimisation

may also imply an incentive to reduce the quality of services. Empirical studies show mixed results with the United States and Great Britain (Kridal, Sappington and Weisman, 1996) and therefore there is no sure answer for the claim that price caps result in impaired quality. There is a commitment problem both with the regulator and the firm. The high-power incentives under price caps depend upon the firm's belief that any cost reduction effort by them will not result in a tightening of its price cap. Studies show that it is almost impossible for a regulator to make such a commitment.

An earnings sharing plan provides a regulated firm with expanded earnings flexibility but requires the firm to share a portion of the extra earnings (profits) it generates with its customers and/or the government (Sappington and Weisman, 1996). This plan provides the firm with some protection against being held up. Sharing provides gains to consumers and therefore it is less likely that there will be political pressure on the regulator to renege on its promise. The incumbent can also be protected against a new entrant by sharing earnings with the regulator and consumers (Weisman, 1994).

Sometimes a revenue sharing plan is called for instead of an earnings sharing plan. Under revenue sharing plans, revenues instead of profits in excess of the target are shared. The basic rationale underlying both earnings and revenue sharing plans is the same. A firm can share the extra profits if they can produce more cost effectively than expected, therefore it provides ample incentive for cost-reduction. However, because the firms share their profits with their customers and the government, their profits rise only by some proportion of any decline in costs. Therefore, the firm's incentive to undertake the diligent effort and sacrifice required to reduce production costs is diminished (Sappington and Weisman, 1996). The plan has the same effect as taxing profits.

2.2 Interconnection Price Regulation

2.2.1 Efficient Component Pricing Rule

Baumol and Willig's "efficient component pricing rule" for interconnection explicitly states that an entrant seeking access to a local network in order to compete in the final goods market should compensate the incumbent for the incremental costs (the resource costs for providing the interconnection) plus the opportunity cost of the net revenue foregone by the incumbent in the final goods market (Vogelsang and Mitchell, 1997). The ECPR guarantees full cost recovery for the incumbent. The full cost recovery property of ECPR relieves the regulatory body from the burden of having to adopt other measures to finance these costs (common and joint cost, cost of universal service, etc) and from the risk of further distortions or deadweight losses. ECPR is designed to exclude any entry that is less efficient than the incumbent in the production of services in "non-natural monopoly" segment of the market (Laffont and Tirole 2000, Church and Ware 2000). This implies that the ECPR works well in achieving productive efficiency.

Another benefit of ECPR is that the incumbent does not have an incentive to erect entry barriers when ECPR is applied. ECPR requires that the bottleneck carrier is indifferent between handling all the business (traffic) itself and cooperating with the connecting carriers. ECPR preserves the incumbent's monopoly profits, so it does not have to block entry to defend its profits by denying the interconnection. These two benefits together imply that ECPR can improve or at the minimum maintain the current welfare because it only allows for efficient entry (Noam, 2001).

The ECPR is a sound theory but its applicability is limited in the real world. It

holds as a first-best pricing principle only if a stringent set of assumptions holds: the monopolist's price for the complementary (non-bottleneck) service has been based on a marginal cost pricing rule; the monopolist's and rival producer's components are perfect substitutes; the production technology of the component experiences constant returns to scale; the rival producer has no market power; and the monopolist's marginal cost of production of the component can be accurately observed (Economides and White 1995). The assumptions under which ECPR would deliver efficiencies do not necessarily hold in telecommunications industry.

The ECPR works well only when applying to a perfectly competitive or contestable market (Mueller, 1998). The provider of interconnection has to offer the final product at a rate established in a competitive market, so that the interconnector does not have to compensate the incumbent for the loss of its monopoly profits due to entry. However, the telecommunications industry is neither perfectly competitive nor contestable. The incumbent in telecommunications often possesses market power. Therefore, substantial government regulation is essential to apply the rule in a non-competitive market. Without final price regulation, the rule gives the monopolist a property right to its monopoly rents. It protects the monopoly of any competitive losses. This is the "perpetual monopoly profits" property of the ECPR discusses by Tye and Lapuerta (1996) and Economides and White (1995).

The determination of interconnection charge for ECPR is based on the assumption that entrants will take over some of the incumbent's business and therefore reduce the incumbent's profits. However, not all the calls handled by the entrants will otherwise be handled by the incumbent (Noam, 2001). More entrants may intensify competition,

which causes the price of the final services to fall and/or better and new services to be provided. These have the effect of expanding the total number of calls, or the size of the telecommunications market. In other words, entry is not a zero sum game but a positive sum game. Both parties may benefit by the increase in market size.

Under the ECPR, entry does not cause direct price reduction in the retail market unless the entrants have a cost advantage over the incumbent (Tye and Lapuerta, 1996). The ability of the price to fall is constrained because the entrant is obliged to compensate the incumbent for its lost monopoly profits. This obligation limits the extent to how much consumer surplus can increase. Entry under ECPR would not satisfy allocative efficiency. In other words, ECPR retains the contribution (margin over incremental cost) already present in the incumbent's retail services. Since these retail prices may have reflected monopoly conditions and/or regulatory subsidies, the rule ignores allocative economic efficiency (Hausman and Tardiff, 1995).

In static efficiency the ECPR secures productive efficiency and fails to satisfy allocative efficiency. ECPR ignores some harmful effects it may pose onto dynamic efficiency. First, this pricing rule offers full cost recovery for the incumbent, and therefore the incumbent does not have the incentive to adopt cost-reducing technology or engage in cost-reducing innovations. Second, the rule precludes any inefficient entry but fails to consider that even an inefficient entrant may invest in capital or new technology, which gives dynamic efficiency gains (Noam, 2001). It is also argued by Economides and White (1995) that ECPR's exclusion of inefficient rivals may be socially harmful. The presence of an inefficient rival in the market could bring net social gain when the price reduction makes the net gain to consumers greater than the inefficiency costs of the rival's pro-

duction. They also point out the possibility of an incumbent using ECPR to exclude a more efficient rival. It can do so by understating its own marginal costs of production of the complementary component (non-bottleneck) and by imposing a heightened ECPR on the rival. If the regulator cannot observe the incumbent's cost perfectly, the incumbent can claim that some production cost for the complementary component should be treated as the production cost of the bottleneck services. The lower marginal cost for the complementary component will then justify a higher access charge.

The efficient component pricing rule has been used in the United Kingdom and New Zealand for telecommunications, and in America in Railroad cases (Noam, 2001). However, it is deemed an unpopular pricing rule for setting an interconnection fee in New Zealand telecommunications. The government clearly states its intention of promoting competition and improving consumer welfare, for which, ECPR fails its task.

2.2.2 Total Service Forward-Looking Long-Run Average Incremental Cost

In a fully competitive market, long-term marginal cost pricing is optimal in terms of economic efficiency in the absence of market distortions. Incremental cost approximates marginal cost when incremental cost is averaged over the increment (Noam, 2001). Incremental cost pricing, like marginal cost pricing, covers the additional costs the incumbent incurred as a result of interconnection. It does not, however, cover the fixed investments of the incumbent. The presence of substantial fixed costs is typical in the telecommunications industry, and the incumbent has to be compensated for such investment. This implies a price higher than the short-run marginal cost. Long-run

incremental cost is therefore suggested for its ability to cover all costs, including capital equipment and plant, since all costs in the long-run are variable. The estimation of long-run incremental cost can be based either on historic costs (the actual cost incurred to build the network) or future (forward-looking) costs.

Forward-looking long-run average incremental cost (LRIC) has become quite popular among regulators as an interconnection pricing rule in recent years. It is used commonly in the United States, the United Kingdom and the continental European countries (Laffont and Tirole, 2000). There are two variants to LRIC: Total Service Long-Run Incremental Costs (TSLRIC) and Total Element Long-Run Incremental Costs (TELRIC). Both TSLRIC and TELRIC require using a hypothetical engineering model to calculate the total costs when the most efficient modern technology is utilised. The total cost for TSLRIC relates to the building of a system (access service) from scratch, and can be applied to the bundled wholesale services. The total cost for TELRIC relates to the unbundled elements (eg. switching, signaling, customer database) that are used to provide the service. TELRIC has increased in importance after it has been adopted in many states in the United States (many local loops are unbundled to several "elements"). Similar methodologies are adopted for the deregulated telecommunication industry in many other countries.

In the new regulatory regime in New Zealand telecommunications, if voluntary negotiation cannot resolve the pricing disputes between access seeker and providers, they can seek a determination from the Telecommunications Commissioner. One of the prescribed pricing principles that the Telecommunications Commissioner can apply to solve dispute is TSLRIC. In New Zealand, the incumbent's local loop is not unbundled, therefore "to-

tal service" instead of "total element" long-run incremental cost is adopted. TSLRIC is defined within the Telecommunications Bill as: "the forward-looking costs over the long run of the total quantity of the facilities and functions that are directly attributed to, or reasonably identifiable as incremental to the service, taking into account the service provider's provision of other telecommunications services; and includes a reasonable allocation of forward-looking common costs". Forward-looking common costs refers to "those economic costs efficiently incurred by the service provider in providing the service that cannot be attributed directly to providing an additional unit to that service".

Using LRIC results in low interconnection prices and therefore it is favoured by the entrants and regulators who wish for fiercer competition. If the goal of regulator is to develop local competition, a long-run incremental (marginal) cost type interconnection pricing rule may be most appropriate. The rule is beneficial to the entrants because it reduces or postpones their contribution to the fixed costs. If a regulator wants to speed up the entry into local competition, basing interconnection fees on the "forward-looking" costs will further benefit the entrants. This is because future costs are always lower than historic costs under the realistic assumption that technology improves with time (Noam, 2001).

LRIC gives the incumbent minimum profits for offering access to the local loop. Therefore, the incumbent has strong incentives to deter entry. Regulatory means is then needed to determine the entry conditions. The use of this methodology involves forecasting future demand and a good understanding of the scale of operations. The estimation bias for either demand or costs or both will lead to under- or over-estimation of costs and therefore the level of interconnection fees would not deliver optimal results.

This approach raises significant practical (as in estimation of different operational, capital costs and in estimation of demand, usage,etc) and administrative problems.

Another problem of LRIC is that the incumbent local exchange carrier (LEC) does not compete with other providers but with a hypothetically efficient network (Noam, 2001). If the incumbent becomes more efficient, then the LRIC will be adjusted downwards and it can charge less for the interconnection services. This gives the incumbent negative incentives in promoting efficiency. The computation of LRIC leaves regulators in charge of setting individual prices and therefore it is of discretionary nature. Because of that, it gives the regulator a key role for managing entry (Laffont and Tirole, 2000).

All "forward-looking" cost basis for interconnection charges is criticised for not being able to cover total costs in most cases. It happens, especially, when in transition from the previous system that tended to under depreciate the capital investment. The price-cost margin will vary among different customers and services. The use of "long-run incremental cost" attracts similar criticism of not being able to cover total costs. The inability to recover historic costs may lead to a deterioration of existing facilities as LECs try to avoid the risk of unrecovered capital investment (Noam, 2001).

Guthrie, Small and Wright (2000) formally analyse and compare forward and backward looking cost rules. Given stochastic costs, it is concluded, forward-looking access prices retard investment and are dominated by access prices determined by historic cost whenever investment is desired, unless the cost of investment is trending upwards with low volatility.

LRIC may lead to interconnection fees that are too low. This may discourage the entrant from building their own network. The construction of TSLRIC is designed to

cover the cost of building a network. If its goal is achieved, then the entrants should be indifferent between buying the service from the incumbent and building its own network. If entrants are diverted away from building its network, regulators should be extremely cautious in re-setting the proper interconnection charge.

2.2.3 Bill and Keep

Two carriers may decide not to charge each other for terminating calls. This usually happens when the two carriers' traffic is balanced and their networks are of similar size. Another reason for bill and keep is where the regulator wishes to support the entrants. A relatively even balance of traffic makes the access charge less relevant (Noam, 2001). If the termination charges they have to pay to each other are of similar magnitude, they may agree to bill their own customers and keep all the revenues. This can save both of them administrative costs. Bill and keep will give each carrier incentives to improve the efficiency of their own network. If one can operate more efficiently, it can keep all the profits from cost-reduction. However, carriers will try to increase their outgoing calls in relation to their incoming calls under bill and keep (Noam, 2001). They might divert the calls in such a way that the calls are terminated by their competitors even they can terminate them with less cost. This dumping traffic behaviour of one carriers gives other carriers incentives to degrade service in order to discourage loading from the other carrier. Applying bill and keep when terminating and originating usage is unbalanced leads to problems. The network with large originating usage can get most of the revenues. This enables it to cut rates and therefore leads to further increase in originating traffic. This outcome of bill and keep undermines its stability (Noam, 2001).

2.3 Regulatory Reform

The regulatory reform in telecommunications services has focused on opening the previously monopolised markets to full competition over the last decade. It requires a different regulatory framework to cope with the more liberalised market. The changes of regulatory rules have led to a change in the role of regulatory institutions in telecommunications (Min 2000). The establishment of an independent regulator is the most visible institutional change among the OECD countries. The goal of having an independent regulator, who is separate from the interest parties, is to ensure fair competition in the marketplace (Min 2000). Another important change is the growing involvement of competition authorities. This may raise issues of inconsistent jurisdiction, which will lead to uncertainty and thus create problems for business decision making.

There is a broad consensus that the regulatory reform in telecommunications is beneficial for both the consumers and businesses. Cross-country empirical evidence on the economic benefits of market and regulatory changes is still lacking, only a few studies (Boylaud and Nicoletti, 2000) have attempted to look at these effects from a comparative, OECD wide perspective. However, data used in Boylaud and Nicoletti (2000) are quite recent and therefore the analysis may not be very robust. The reason why studies are focused on the performance measure of a single country is partly due to the deficiency of internationally comparable data. The myth concerning the link between regulatory regimes and telecommunications services performance remains unsolved. Boylaud and Nicoletti (2000) try to provide some insights into this problem. They find, generally speaking, that a more liberalised regulatory regime gives a better performance. However, construction of an index to present the degree of liberalisation is subject to the

availability of data and subjective selection of relevant factors. The definition of better performance is generally represented by a higher productivity, lower prices and higher service quality.

Nicoletti (2000) looks at the patterns of regulation in service industries and explores their implications for service performance. The empirical evidence, including cross country analysis, suggests that regulatory reform could contribute substantially to improve economic performance and living standards in the OECD area.

New Zealand's light-handed regulatory regime has been controversial. Despite the fact that the New Zealand government threatened further regulatory measures, voluntary negotiations have yet to deliver satisfactory outcomes. Aspects of the regime which have been less satisfactory include the cost of and delays in resolving litigation over interconnection. This may have delayed and limited the benefits brought by competition. This, combined with the Privy Council's decision regarding local access, gave government further thought on improvement measures. Interconnection has been a bitter issue between Telecom and Clear for eight years. After the maturity of the last interconnection contract and weeks long negotiations that ended in September 2001, Clear decided to leave the interconnection issues to the regulator when the new regulatory regime comes into effect at the end of 2001.

2.4 Competition

The regulatory reform in telecommunications industry has been mild so far. Dominant firms have often been able to delay or prevent the onset of full competition (Shephard, 1998). When there is a dominant firm in the market, there may not be enough

comparable rivals to ensure against collusive behaviour. The effects of competition largely depend upon the competitive power of the incumbent's rivals (Shephard 1998). Competition may be easier to ignite in the long-distance market where market prices for the final service are high owing to the inheritance of cross-subsidisation practised by the incumbent in pre-deregulation era. With the gaining of significant market power by the entrants, competition can take root and progress to many other segments of telecommunications markets. Therefore, in order to create effective competition, it is important to break or reduce monopoly power or to forestall its emergence. Spiller and Cardilli (1997) list four key building blocks that determine how quickly facilities-based competition will emerge once the telecommunications sector is demonopolised: interconnection, equal access, unbundling and industry structure. Most literature gives interconnection focus attention (Laffont and Tirole 2000, Vogelsang and Mitchell 1997, Spiller and Cardilli, 1997). It is argued that the entrants' interconnection right should be established to facilitate competition. In New Zealand, the omission to establish interconnection rights for the entrants later resulted in serious adverse consequences (Spiller and Cardilli, 1997). Interconnection issues may include details such as pricing, location of points of interconnection, number portability and technological interface and so forth. The technical standards set by the owner of the local loop may also be used as a way to cut down the competitive power of its rival networks. Much thought has been given to the pricing of interconnection. Other interconnection issues have not been discussed much in the literature. This may because the pricing of interconnection is an economic problem while other issues are more technical and require specialist knowledge.

The equal access problem is addressed by Spiller and Cardilli (1997). They exam-

ine the telecommunications deregulation of four leading small countries: Chile, New Zealand, Australia and Guatemala. The four countries all pushed toward the goal of equal access. Drawing from Chile's experience, the transition to equal access would lead to a dramatic cut in prices and increased consumption of long-distance calls.

Unbundling is not required in Australia, New Zealand and Chile. In Guatemala, however, instant competition was desired, and unbundling was used to facilitate transition to competition. What facilities should be unbundled and to what extent are sensitive issues. If services are unbundled too finely and rival carriers can resell the same service and still make a profit, the capital investment may be forestalled. This is the so called *appropriablity* problem discussed by Mueller (1998). The appropriablity problem can have serious consequences in the long run that even the dynamic efficiency improvement of competition cannot cure.

The industry structure discussed by Spiller and Cardilli (1997) concerns two crucial choices. The first question is, whether or not the vertically integrated monopoly should be broken up. The second question is, what is the desirable extent of competition to be introduced into the market? It is well recognised that competition is beneficial in improving dynamic efficiency. However, it may erode the availability or the quality of the universal service if the holder of the local loop is not well compensated for the cost of providing that service. Countries with a small economy and thus small demand may not welcome two full-fledged network carriers in operation. The penetration rate of the incumbent may also affect the decisions by the regulators about the structure of telecommunications industry.

Chapter 3

Interconnection Problem

Chapter 3 examines the sources of an incumbent's market power and the way it uses such power to weaken its competitors' ability to compete through especially, the pricing and terms and conditions of interconnection.

3.1 Sources of the Incumbent's Market Power Before Deregulation

Prior to the deregulation, network facilities in telecommunications around the world were mostly under the control of state-owned enterprises (SOEs). Those SOEs were protected by statute, which gave them a legal monopoly status. The rationale supporting such strict government control that forms this specific market structure arose from the arguments of the natural monopoly. The legal barrier to entry sheltered the SOEs from the possible emergence of any rival service providers and therefore forestalled future competitive pressure. The possession of market power due to its monopoly status gave

the SOEs freedom to charge monopoly prices for their services and thus enabled them to enjoy monopoly profits even though their services may not have been tailored to meet the demand of their customers. Since the ongoing large profits of the statutory monopoly were safeguarded by laws, there was no need for them to produce or operate efficiently or in a cost effective manner. At the time, the variety of services was very restricted, the prices of telecommunications services were high and the quality of both the telecommunications service and customer service were inferior. Maurice P. McTigue (1996) describes the telecommunications disaster before the regulatory reform in New Zealand. In his words,

> *"New Zealand's telephone operation was run by the Post Office, though nobody seemed to know exactly why. No one could buy a telephone anywhere else in New Zealand, in fact it was illegal to do so. Customers had two choices - it was either a black phone or a white phone and they had a round dial on the front of them. Only the Post Office could provide fax machines. If you wanted a new line into your office or your home, it frequently took up to 6 months to get it. Breakdowns and repairs often would take as much as a week to be effected, and were always done by three men, even if the breakdown was only minor. Overloads were constant. Nearly every business day the telephone networks in the major centres would go to overload at about 9 am and would remain overloaded at 2 pm. During this time, connecting to another party would take up to 20 minutes. Costs rose continually and, unfortunately, the management was thoroughly incompetent".*

This example gives us some idea of how the SOE managed its business and how it served its customers.

3.2 Sources of the Incumbent's Market Power After Deregulation and the Problems in Creating Effective Competition

Competition was generally seen as the best way to increase consumer welfare and to improve both productive and allocative efficiency if the market be not overly distorted. It was also hoped that competition could bring about dynamic efficiency improvements induced by innovation and capital investment. To initiate competition in the telecommunications market, the removal of the legal barriers to entry was essential. Prompted by technological advances, the widespread deregulation transformed the telecommunications industry in 1980s. The change in technology meant that some parts of the vertical structure were not deemed natural monopolies anymore. Therefore, it was considered possible for governments to open up those parts of production for competitive pressure. In particular, the long distance market was thought to no longer be a natural monopoly and therefore competition was initiated in this segment in many countries. Effective competition has a potential to drive down the prices of services to reflect the underlying cost structure. Profit-maximising firms may try to differentiate their services in order to earn profits at least in the short run. The competitive pressure can also drive off telecommunication service providers who deliver low quality services if the market distortions are reduced to their minimum.

The introduction of competition into the telephone market is a complex issue. Prior to deregulation, most SOEs were vertically integrated natural monopolies, and therefore significant reconstruction of both the industry and the regulatory regime was required to reduce the market power of the SOEs and to create a level playing field for the entrants. These SOEs' market power arose from their basic vertical structure – the incumbent SOEs owned the natural monopoly facilities, the use of which was essential for the entrants to offer any upstream or downstream services, and the incumbent SOEs also provided services in the upstream or downstream market where competition was being initiated. In some countries, separation policy was adopted to break up the vertical structure. However, making such a policy decision involves the evaluation of the existence and the benefits of the supply side economies of scope arising from the incumbent operating in both competitive and non-competitive segments. Other countries sought to control the extent to which the incumbent can exercise its market power by various forms of regulation and information disclosure requirements.

Another source of market power stemmed from the demand side. An additional user increases the value of the network to the existing users because there is one extra user to call and to receive calls from. That is to say, an additional user creates network externalities. The more users who join the network, the greater the value of the network (as presented by users' utility of being a member of a particular network). Due to the fact that the incumbent generally had a network with wider geographical and population coverage, it was favoured by the subscribers over its rivals as their network service provider.

Entrants have to seek connection with the incumbent's local loop to eliminate their

competitive disadvantage from the demand-side economies of scope. They also have to connect to the incumbent's network to be able to complete calls from their customers to the incumbent's customers and vice versa. This interconnection requirement applies to both entrants who have their own facilities and to entrants without their own facilities. However, it is often in the incumbent's best interest to charge its rivals a high price for using its bottleneck facilities. This incentive to set high access or interconnection charges hurts the new entrants, because it raises their costs. This may make entry unprofitable and thus have an adverse effect on competition. A need may arise to regulate interconnection charges and/or prices for the final services to generate competitive parity among rivals when the incumbent tends to abuse its market power.

Anther deterrent to effective competition is that the vertical structure of the incumbent allows it to foreclose competition in the upstream or downstream market. For example, if entry occurs mainly in long-distance services but the local network is protected from competition (either by a statutory monopoly or by the fact that the local loop is a natural monopoly), the incumbent can use its monopoly profits in the local services to cross subsidise its competitive services. It can therefore afford to price its competitive services at prices below marginal cost. This would reduce or eliminate the profit margin faced by potential entrants, which may make entry unprofitable even for carriers that are more efficient than the incumbent.

The reason why the local loop is still a natural monopoly can be attributed to the existence of huge sunk costs necessary in developing a physical telephone network with geographical and population coverage large enough to meet the demands of all users in a country. Entrants who are just starting doing business, often prefer to pay the incum-

bent for the use of the available network rather than build a physical network, especially when entering an uncertain market and when interconnection fees are reasonable. Thus, the entrants can save the cost of having to build their own local network. If the interconnection fees are too high, however, the entrants may prefer to duplicate a smaller local network to bypass the incumbent's local loop. This bypass investment may not be socially desirable because it may lead to under-utilisation of network facilities if the market demand is small. Duplicating network facilities with the same technology gives no efficiency gains and wiring the same area twice does not add more benefits to consumers. Therefore, interconnection arrangements are necessary to avoid duplication of existing facilities. How to set the interconnection charge to ensure the optimal amount of capital investment in the long run is the focus of many regulatory bodies.

Correction of market imperfections can help to avoid premature deregulation that gives the incumbent an upper hand when competing with its rivals. The pitfalls of premature deregulation may not be remediable and may make effective competition unattainable. Effective competition that emerges from the healthy work of market mechanisms will automatically act to increase efficiency and consumer surplus. However, the universal service obligation imposed on the incumbent might give rise to more complications. When entry occurs in the long-distance market only, the incumbent can recover the cost of universal service obligation from monopoly profits in the local services, i.e. by letting local services cross-subsidise long-distance. Effective competition in all market segments gives the incumbent zero economic profits, and therefore the possibility of cross-subsidisation – using the profits from other services to finance the universal service obligation – is reduced or totally eliminated. The incumbent may not

be able to fulfil its universal service obligation unless other means of financing are proposed. The deficit of universal service obligation can be financed either through the call termination charge or through a lump sum payment by government or shared among other industry participants. It is generally agreed among economists that the payment to the incumbent should be lump-sum in nature. Inflating the interconnection charges to compensate for the universal service obligation distorts the price structure and disturbs the supply and demand relationship.

3.3 Governments' Role in Curing Market Imperfection

The problems outlined above concerning the unbalanced market power justify the need for government intervention. However, this does not mean that government intervention is the sole medicine for all problems. The well-known shortcoming of government intervention is its tendency to be influenced by different interest groups or political parties even when the regulation authority has the best intentions. The responsibilities of a regulatory authority are numerous. It not only has to ensure free entry for competition purposes, but also once the conditions for free entry are established, it has to monitor the behaviour of both the incumbent and new entrants to prevent any anticompetitive practices. These anticompetitive practices include the incumbent's efforts to block entry either by pricing strategies, unfair conditions to interconnection, collusive behaviour among network operators, and mergers between service providers.

It is not difficult to understand why the incumbent would be so hostile toward en-

trants. It has nothing to gain but everything to lose from competition, and therefore it would attempt to delay or prevent a rival from bringing in competition in whatever markets it operates. The objective of a regulatory authority is to maximise both consumer surplus and productive efficiency gains. It is sometimes difficult to achieve both goals at the same time. Different regulatory regimes have been formed by various governing institutions and related regulation rules in different countries. This, together with country specific conditions (such as economic conditions, market structure, industry specific history and characteristics) determine the extent to which the two objectives are achieved. Care should be taken that regulation is not just about the system, the industry specific rules or the institutions. It is also about people and how people do things. Therefore public opinion and all related groups' understanding of the regulation play a major role in policy making and implemention. The regulatory regime and policy design should aim at encouraging cost reduction, innovation and capital investment. Minimum uncertainty has to be ensured to minimise distortions in the timing of businesses' investment decisions. Any regulatory regime that is surrounded by too much uncertainty should be subject to inspection and modification.

Government intervention always comes at a price, either explicit or implicit. A regulatory authority bears the risk of causing further market distortions with every arbitration or ruling it makes. Not only that, a government has to pay out of its pocket for gathering market information and data that are necessary for price setting or to monitor the behaviour of all market participants. This reduces the consumer welfare because the funds have to be shifted away from other uses such as education. Under the realistic assumption that the network operators know themselves better than other

operators and regulators (for instance, its cost function and the cost reduction effort), a regulatory authority, who is the third party, may not be able to make a well-informed determination on issues such as the setting of the interconnection fee or how number portability should be accomplished. It is questionable to what extent the information provided by the industry itself truly reflects the market conditions or the costs of the incumbent and other market participants. Numbers can cheat, especially when the market participants are given an incentive to do just that. Therefore, asymmetric information gives market participants a chance to exploit the weakness of regulatory authorities for their own benefit.

3.4 New Zealand Example

The New Zealand government adopted a light-handed regulatory regime for which commercial negotiations were given the important role of replacing the numerous functions of regulations. The light-handed regime originated between 1987 and 1990. It relies heavily on the courts and sections 27, 36 and 47 of the Commerce Act to resolve disputes and to prevent anticompetitive behaviour. The regime has become somewhat of an economic experiment since almost all other nations have chosen to be more cautious over the extent of freedom given to their telecommunications industry. Although the use of courts to resolve interconnection problems or disputes was expected to be the last resort, in reality, the courts were heavily used in the New Zealand context. Voluntary negotiations on interconnection issues fell apart due to the lack of incentives for the incumbent to offer "fair and reasonable" terms and conditions to its rivals. Besides the arguments of appropriate pricing principles for interconnection fee setting, other

matters of contention such as equal access and unbundling all have subtle effects in the redistribution of market share and market power. In order to resolve the outstanding issue of number portability, Number Administration Deed was set up in New Zealand. This can be seen as a form of industry self-regulation.

Although deregulating legislation did not specify equal access, the threat of generic antitrust litigation led Telecom (incumbent) to agree to provide equal access to Clear (entrant). It was initially agreed that once the market share of Clear reaches 9 %, its subscribers do not have to use a special access code to access Clear's telephone network and thus equal access would be accommodated. However, Telecom was dilatory in actual implementation, even though it was implemented now.

The litigations between Telecom and Clear over pricing principles soon after deregulation were not only time consuming, but also generated a great deal of uncertainty. It takes years and many law suits to build up a precedent so that the industry would know what to expect. Owing to the fact that most decision makers of a company are risk averse, uncertainty delays the entry of network operators into the market. Since the timing of entry can have far-reaching consequences over market structure, the extent of competition is hence affected. On the other hand, Clear could only sue Telecom on the grounds of its anticompetitive practices concerning the use of Telecom's dominant position according to section 36 of the Commerce Act, and it had to prove this violation. As shown by the case history, it is difficult to prove the abuse of Telecom's market power or its actual anticompetitive practices by giving evidence. The fundamental innocent-unless-otherwise-proved attitude of the courts does not provide a correct incentive to achieve the government's wish for immediate competition. Therefore the use of courts

cannot actively encourage competition in the telecommunications industry and is only able to confront the problem once it gets severe enough for someone to raise the case. In the light of this, the court dispute resolution system is considered a passive and faulty device. There remain questions about the ability of a court to comprehend the long run effects of its judgements. The lack of expertise further shows the vulnerability of a court for such an important task. Such weakness was even recognised by the court itself. A light-handed regulatory regime is unable to accomplish the government's goal, that is, to maximise both consumer welfare and productive efficiency gains.

For more than a decade, the regulatory regime of New Zealand has been under vast criticism. It is believed that modification of the regulatory regime is needed to actively counter the predicament. In March 2000, the government of New Zealand mandated a telecommunications inquiry to gain more insights into the situation and sought public opinions for possible solutions. The government considered each recommendation from the Inquiry and made its decision on the changes to the regulatory regime. The Telecommunications Bill was introduced in May 2001. After the first reading, it was sent to the Commerce Select Committee for further scrutiny. The report came back in September with some amendments. The Telecommunications Act was passed in December 2001 and a Telecommunications Commissioner was appointed in the same month.

In Chapter 6, I will describe the process of the Inquiry and the recommendation it made to the government. The government's final decisions on what changes are necessary to be included in this second regulatory reform are discussed. More in depth issues concerning the resulting regimes of two reforms, such as the detail of the changes and the comparison of two regimes are discussed and analysed in Chapters 8.

Chapter 4

Performance Comparison over Country Groups with Different Regulatory Regimes

Technological innovation has broken the "natural monopoly" rationale for the rightful existence of a legal barrier to telecommunications services and equipment. Some segments, such as the long distance telephony, have dropped out of the natural monopoly status and therefore competition may be desirable. This led to the widespread deregulation movements in the 1980s and 1990s of the OECD countries. In order to counter the problem of market imperfections that are typical in the telecommunications industry, the leading deregulating countries developed various new regulation techniques. It is worth noting that the regulation practices adopted during the regulatory reform were quite different from those under the state-owned monopoly era. The new regulatory practices focused on preserving economic incentives giving businesses higher motivation

to act in a profit-maximising and/or cost-minimising manner.

Each country has its own specific economic and market conditions, and therefore the scale and the scope of deregulation varies across OECD countries. Other factors, such as the timing of deregulation, the speed of the deregulation process, the length of lags for the deregulation to impact on market structure, etc. have contributed to placing different OECD countries in different positions along the regulatory reform process.

In this chapter, I intend to examine what regulatory regime (in terms of the extent of liberalisation) would deliver a better performance measure – such as low price, high productivity and high quality – in the telecommunications industry. To this end, I follow the approach by Boylaud and Nicoletti (2000) to group twenty-four OECD countries with regard to their similarity in regulatory environment and market structure. Scatterplots are used to present the price-productivity and price-quality performance relationships to assist in identifying "groups of countries" that generally give better performance related to the OECD average. I discuss the institutional settings and market structure of these different groups in detail in Chapter 5.

This chapter is of threefold: The first part is devoted to the construction of the regulation and market structure indicators. These indicators are used to run factor and cluster analysis. The cluster analysis groups countries according to their similarity in regulation and market structure. The second part of this chapter discusses the econometric model used by Boylaud and Nicoletti to infer the effects of deregulation on telecommunications performance by finding the variables that best explain the variation of regulatory regime and market outcomes over both time and countries. Based on this result, the performance measures that have contributed to regulation and market struc-

ture can be singled out. The third part combines the information from part one and part two to show how performance and regulatory regimes are interrelated. I intend to use the scatterplots to represent such links. A detailed examination of regulatory regimes that follows the interpretation of the scatterplots will be given in Chapter 5.

4.1 Regulation and Market Structure Indicators

Boylaud and Nicoletti use an original international database on regulation, market structure and performance in the telecommunications industry to investigate the effects of entry liberalisation and privatisation on productivity, price and quality of services in domestic long distance (trunk), international long distance (international) and mobile cellular (mobile) telephony services. In addition, the effect of changes in the regulatory and market structure of trunk services on the prices of leased lines services (leasing) is also analysed. Some services (such as local fixed voice telephony) are not included in the study due to the fact that they are still monopolistic in a vast majority of OECD countries. The inclusion of these services, therefore, cannot provide insights into how competition, which was created with the initiation of market liberalisation, affects the performance.

The following four indicators of the market and regulatory environment were constructed over the period 1991-1997 for each of the telecommunications services considered in the analysis other than mobile services (1993-1997). The liberalisation index ranks the legal limitations on the number of competitors allowed in each market. The index of state ownership is based on the share of the public telecommunications operator's (PTO's) capital owned by the state and the presence of special voting rights.

The index of internationalisation of domestic markets is based on the number of non-resident operators participating in alliances, joint ventures or cooperation agreements with domestic operators aimed at providing services in the domestic telecommunications markets in 1995. Lastly, the index of actual market structure is based on the market share (in total traffic) of new entrants in trunk and international services and by the number of competitors in mobile services.

In addition, two indicators are used to proxy for anticipations of future changes in regulatory policies. The prospect of liberalisation index measures the number of years remaining before liberalisation of each market. The prospect of privatisation index measures the number of years remaining before the first sale of PTO shares by the government.

These indicators are used to describe the cross-country patterns of regulation and market structure. Applying the factor analysis to the indicators over the 1993-1997 period (due to unavailability of data on mobile service previous to 1993), four main factors that determined the position of each OECD country along the reform process are identified (Table 4.1). The first factor (associated with liberalisation and market structure in trunk and international, state ownership and internationalisation) expresses the market and regulatory environment in fixed telephony; the second factor (associated with prospects of liberalisation of all services) expresses the timing of the liberalisation process; the third factor (associated with liberalisation market structure in mobile services) expresses the market and regulatory environment in mobile services and the last factor (associated with prospects of privatisation) expresses the timing of the privatisation process. Countries can be scored along each of the four factors (a higher score

Table 4.1: Regulation and Market Structure : the Discriminating Factors, 1993-1997

Rotated Factor Loadings

	Market and Regulatory Environment in fixed Telephony	Timing of the Liberalisation Process	Market and Regulatory Environment in Mobile Telephony	Privatisation Perspectives
Liberalisation Index:				
International	0.86	0.26	0.14	0.19
Trunk	0.88	0.26	0.17	0.19
Market Structure:				
International	0.90	0.15	0.25	0.07
Trunk	0.84	0.12	0.06	0.14
State Ownership of PTO	-0.60	-0.13	-0.31	-0.14
Liberalisation Perspectives:				
International	0.55	0.78	0.04	0.00
Trunk	0.55	0.78	0.04	-0.01
Mobile	-0.05	0.85	0.21	0.12
Interntionalisation of Domestic Market	0.62	-0.17	0.62	-0.05
Liberalisation Index:				
Mobile	0.12	0.44	0.64	0.49
Market Structure:				
Mobile	0.22	0.20	0.88	0.13
Privitisation Perspectives	0.26	0.03	0.14	0.92

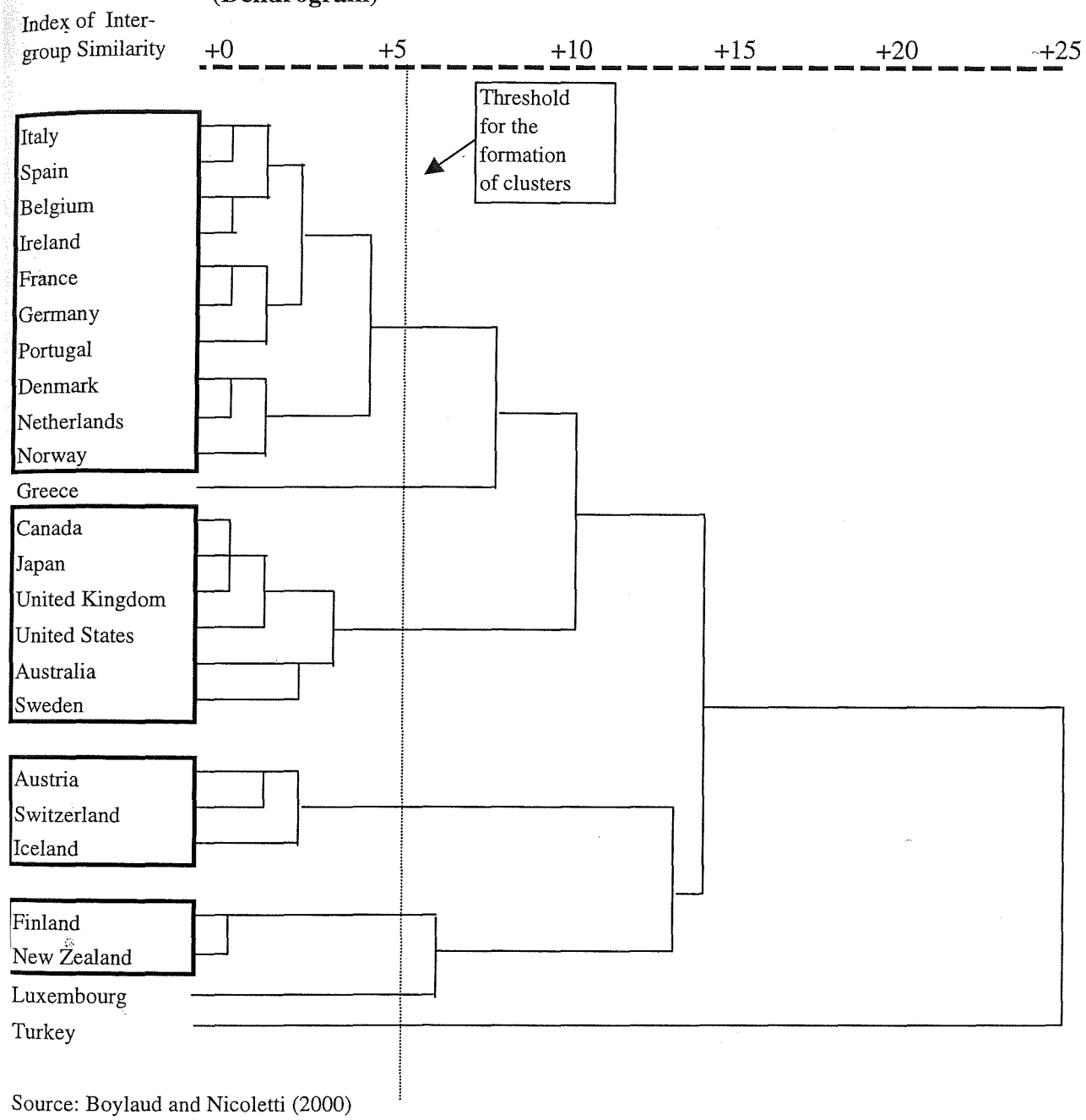
Notes:
Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalisation
Rotation Coverged in 10 iterations
Source: Boylaud and Nicoletti (2000)

implying a more liberalised regulatory and market environment) and the average scores over the 1993-1997 period constitute the basis for positioning countries along the regulatory reform process.

Given the position of each country (represented by a different score with respect to the discriminating factors), the distance (the dissimilarity in regulatory environment and market structure) between countries can be calculated. Dendrogram is used to represent such distance (dissimilarity) between countries. Following the Dendrogram (Figure 4.1), twenty-four OECD countries are separated into four major groups and three outliers. Countries in the same group are considered similar in regulation and market environment as measured by the regulation and market structure indicators. Group one (G1) consists of ten countries including Italy (Ita), Spain (Spa), Belgium (Bel), Ireland (Ire), France (Fra), Germany (Ger), Portugal (Por), Denmark (Den), Netherlands (Net) and Norway (Nor). Group two (G2) consists of Canada (Can), Japan (Jap), the United Kingdom (UK), the United States (US), Australia (Aust) and Sweden (Swe). Group three (G3) countries include Austria (Au), Switzerland (Swi) and Iceland (Ice). Group four (G4) consist of Finland (Fin) and New Zealand (NZ). Three countries Greece (Gre), Luxembourg (Lux) and Turkey (Tur) bear the least similarity in regulatory environment and market structure with other OECD country groups and therefore are not included in any country groups, and are called outliers. The ranking of country groups in liberalisation can be established as follows. The most liberalised countries are in G2. G4 countries ranked second in liberalisation. G1 is the third most liberalised country group. The least liberalised country group is G3.

Figure 4.1: Grouping Countries According to Regulation and Market Structure

(Dendrogram)



Source: Boylaud and Nicoletti (2000)

4.2 Econometric Model

Boylaud and Nicoletti exploit the variation of regulatory regimes and market outcomes over both time and countries to infer the effects of deregulation on performance. The model is built as follows. The dependent variable (y_{ist}, performance measures, including productivity, price and quality) is a function of the four explanatory variables: country specific effects, f_i; a set of exogenous economic characteristics that are assumed to influence performance independent of regulation and market structure, $Z_s[i,t]$; a set of market structure indicators, $M_s[i,t]$ and; a set of regulation indicators, $R_s[i,t]$. This can be shown as:

$$y_{ist} = c + \alpha_{is} f_i + Z_s' \beta_s + M_s' \gamma_s + R_s' \delta_s + \varepsilon_{ist} \tag{4.1}$$

The model is estimated for single service (eg. trunk) or for all services pooled using panel data technique, considering countries as the relevant individuals. Table 4.2 describes the economic structure (income, costs and price rebalancing indicator) and technology indicators (percentage of digital and capital intensity) used in this empirical analysis. Price rebalancing indicator for economic structure is constructed to proxy the extent to which the price deviated from underlying costs. The indicators of regulation and market structure are constructed to increase the precision and reliability of the coefficient estimates.

Table 4.3 shows how the performance measures are constructed. Due to data constraints, Boylaud and Nicoletti use a narrow definition of output, including the number of subscribers (for the trunk and mobile services) and the number of minutes of outgoing telecommunications (for the international service). The input measurement is focused

Table 4.2: Indicators of Technology and Economic Structure for Empirical Analysis[1]

Model	Definition	Period	Obs	Coefficient of Determination	Minimum	Maximum	Mean	Standard Deviation
Technology: Percentage of Digital								
International	% Digital Lines in Total Mainlines	91-97	168.0	0.3	0.0	1.0	0.7	0.2
Trunk	% Digital Lines in Total Mainlines	91-97	168.0	0.3	0.0	1.0	0.7	0.2
Mobile	% of Digital Subscribers	93-97	120.0	0.8	0.0	1.0	0.3	0.4
Technology: Capital Intensity								
All Services	Total Fixed Investment in Telecom/Total Employment	91-97	168.0	0.5	1.0	15.0	4.1	2.2
All Services	Total Fixed Investment in Telecom/Number of Mainlines	91-97	168.0	0.4	57.0	505.0	221.0	91.0
All Services	Telecom Capital Stock(cumulated sum of investment over 10 years) /Number of Mainlines	91-97	168.0	0.4	145.0	3061.0	1777.0	641.0
Economic Structure: Income								
All Services	Total Telecom. Revenue/Population	91-97	168.0	1.5	0.6	66.0	5.2	7.6
All Services	GDP/Population	91-97	168.0	1.7	0.5	33.0	2.4	4.1
Economic Structure: Costs								
All Services	Total Operating Expenditure/Total Employment	91-97	168.0	0.4	85.8	2971.0	1055.0	455.0
All Services	Total Operating Expenditure/Number of Mainlines	91-97	168.0	0.4	0.7	12.0	5.9	2.3
Economic Structure: Price Rebalancing Indicator								
All Services	Distance of Price Structure in Country i at time t from the Price Structure of the Uk in 1998[2]	91-97	154.0	0.2	43.3	98.0	67.0	13.0

1. Values are in US$ based on 1993 PPPs
2. The distance was computed us (100-1/4(SUM(ABS(PDISTXuk98)) where X=local, 27km, 110km, 490km and PDISTX = price for the distance X

Source: OECD Telecommunications Database

Table 4.3: Performance Indicators for Empirical Analysis[1]

Model	Definition	Period	Obs	Coefficient of Determination	Minimum	Maximum	Mean	Standard Deviation
Productivity								
International	Outgoing Minutes of International Communications (MITT) /Total Employment	91-97	168	1.5	2177	346637	35170	52937
Trunk	Number of Mainlines/Total Employment	91-97	168	0.3	77.4	337.8	183	48.2
Mobile	Number of Mobile Subscribers/Mobile Employment	93-97	110	2.7	80	32196	1288	3458
Prices								
International	Collection Charges (average of peak 1 minute to OECD countries)	91-97	168	0.4	0.5	2.9	1.1	0.4
International	Revenue From International Service/Outgoing MITT	91-97	168	0.6	0.1	2.8	0.9	0.5
Trunk	Tariff Basket (Excluding Tax)	91-97	161	0.4	375	2530	1138	418
Mobile	Revenue From Mobile Service/Number of Mobile Subscribers	93-97	115	0.6	173	2894	775	451
Leasing	OECD Basket of National Leased Line Charges:64 kbit/s (excluding tax)	91-97	161	1.5	19745	1632547	103880	159784
Quality								
International	Answer Seizure Ratio[2]	91-97	168	0.1	36.9	70.7	60	7.2
Trunk	Service Reliability (average of call success rate and fault clearance rate)	91-97	167	0.7	0.8	47.5	16.1	10.7

1. Values are in US$ based on 1993 PPPs
2. The answer seizure ratio is the proportion of international calls that successfully seize an international circuit and are answered in the terminating country
3. The call success rate is defined as one minus the number of faults per mainline. The fault clearance rate is the number of faults repaired in 24 hours

Source: OECD Telecommunications Database

on labour input only. Such partial productivity measures may be misleading, as pointed out by Boylaud and Nicoletti, because they are unable to account for cross country productivity differences induced by the use of different factor proportions. To construct price data, Boylaud and Nicoletti apply OECD tariff baskets and supplement them with two measures of "average prices" in the international and mobile services: international revenue per minute of outgoing conversation and mobile revenues per subscriber. The differences from OECD average are presented in percentage points (eg. -0.4 means below OECD average by forty percent). The quality is proxied by a combination of number of faults per mainline (so-called "call failure rate") and number of faults repaired within twenty-four hours (so-called "fault clearance rate") in trunk telecommunications. In international services, the quality is proxied by the percentage of calls completed (so-called "answer seizure ratio").

Each equation (based on model 4.1) is estimated using a random effects specification and a fixed effects specification model. The slope coefficients are assumed to be identical across countries. Tests for model specification and the correction for heteroskedasticity are conducted although in most cases controlling for potential heteroskedasticity did not significantly change the result. The regulatory and market structure are good indicators because they significantly improve the fit of the regressions. The degree of market competition and the time to liberalisation are the two main explanations for the cross country and time variability in productivity and prices.

The results of the regression analysis can be used to calculate the relative contribution of, on one hand, country-specific and structure effects (economic structure and technology) and, on the other hand, regulatory and market structure effects to explain-

ing differences in performance across OECD area. The intention here is to separate the contribution of "regulatory and market structure" variable and "non-regulation and market structure" variable on performance. Based on the calculations, cross-country rankings along each of the dimensions of performance can be established, filtering out both the effects which could not be explicitly accounted for in the regressions and the effects that are not related to the regulatory environment and market structure. The focus is on the telecommunications industry as a whole, so the discussion is based on the results of the pooled regression. Using the results of the pooled regression, the performance deviations that can be attributed to regulation and market structure are summed up to three categories: market structure (proxy by the market share of new entrants), liberalisation (proxy by time to liberalisation) and ownership and privatisation (proxy by state ownership index and time to privatisation).

4.3 Relation Between Performance and Regulatory Regimes

Tables 4.4, 4.5, and 4.6 give the relative contributions of the unexplained country-specific effects (in nature), the structure effects (including economic structure and technology) and the effects of regulation and market structure on the deviation of an individual country's performance from the OECD averages. In Tables 4.4, 4.5, and 4.6 the actual performance (productivity, price and quality respectively) deviation from OECD averages are in column one. The deviation arises from three sources as specified in the model: country specific effect, economic structure and regulation and market structure.

Table 4.4: Explaining Cross-Country Differences in Telecommunications Performance (Pooled Estimates)

Productivity[1]

	Productivity	**Country Specific Effect**	**Economic Structure**[2]	**Regulation and Market Structure (a+b+c)**	Market Structure (a)	Liberalisation (b)	Ownership and Privatisation (c)
Australia	-0.70	-1.00	-0.09	0.39	0.06	0.44	-0.10
Austria	0.19	0.25	0.12	-0.18	-0.06	-0.12	0.00
Belgium	-0.05	0.46	-0.03	-0.47	-0.09	-0.12	-0.27
Canada	-0.35	-0.40	0.06	-0.01	0.11	0.42	-0.54
Denmark	-0.02	0.37	-0.12	-0.27	0.00	0.15	-0.42
Finland	-0.17	-1.33	0.05	1.11	0.14	0.38	0.59
France	-0.08	0.00	0.13	-0.21	-0.01	-0.10	-0.10
Germany	-0.20	-0.04	0.14	-0.30	-0.01	-0.10	-0.19
Greece	-0.10	0.44	-0.20	-0.33	-0.01	-0.90	0.58
Iceland	-0.29	-0.11	-0.14	-0.04	-0.14	-0.10	0.20
Ireland	-0.73	-0.30	-0.06	-0.37	-0.06	-0.12	-0.19
Italy	0.39	0.56	0.11	-0.28	-0.04	-0.10	-0.14
Japan	0.23	-1.05	0.11	1.17	0.16	0.44	0.57
Luxembourg	2.46	1.82	0.29	0.35	-0.14	-0.10	0.59
Netherlands	0.50	0.80	0.04	-0.34	-0.03	0.03	-0.33
New Zealand	-0.36	-0.39	0.02	0.01	0.09	0.44	-0.52
Norway	-0.53	-0.99	-0.03	0.48	-0.01	-0.10	0.59
Portugal	-0.44	0.23	-0.02	-0.65	-0.01	-0.37	-0.28
Spain	-0.06	0.23	0.04	-0.33	-0.06	-0.10	-0.17
Sweden	-0.14	-1.08	-0.04	0.98	0.03	0.35	0.59
Switzerland	0.75	0.94	0.06	-0.24	-0.14	-0.10	0.00
Turkey	0.47	1.35	-0.26	-0.62	-0.11	-1.10	0.59
United Kingdom	-0.31	-0.25	-0.09	0.03	0.11	0.44	-0.52
United States	-0.28	-0.32	-0.08	0.12	0.22	0.44	-0.54

1. Deviations from the OECD average
2. Including the effect of technology

Table 4.5: Explaining Cross-Country Differences in Telecommunications Performance (Pooled Estimates)

Prices[1]

	Productivity	**Country Specific Effect**	**Economic Structure**[2]	**Regulation and Market Structure (a+b+c)**	Market Structure (a)	Liberalisation (b)	Ownership and Privatisation (c)
Australia	0.16	0.70	-0.08	-0.46	-0.05	-0.41	0.00
Austria	0.41	0.33	-0.06	0.14	0.05	0.11	-0.02
Belgium	0.21	0.15	-0.16	0.22	0.08	0.11	0.03
Canada	-0.13	0.23	-0.04	-0.32	-0.10	-0.39	0.17
Denmark	-0.86	-0.65	-0.14	-0.06	0.00	-0.14	0.08
Finland	-0.80	0.07	-0.26	-0.60	-0.12	-0.36	-0.13
France	-0.09	-0.02	-0.17	0.10	0.01	0.09	0.00
Germany	-0.10	-0.04	-0.18	0.12	0.01	0.09	0.02
Greece	-0.07	-0.40	-0.41	0.74	0.01	0.84	-0.12
Iceland	-0.64	-0.77	-0.04	0.16	0.12	0.09	-0.06
Ireland	0.14	0.12	-0.16	0.18	0.05	0.11	0.02
Italy	0.17	0.12	-0.11	0.16	0.03	0.10	0.03
Japan	1.01	1.70	-0.03	-0.66	-0.14	-0.41	-0.11
Luxembourg	3.37	0.00	3.28	0.09	0.12	0.09	-0.13
Netherlands	-0.36	-0.24	-0.17	0.05	0.03	-0.03	0.05
New Zealand	-0.46	0.00	-0.12	-0.34	-0.08	-0.41	0.15
Norway	-0.80	-0.70	-0.07	-0.02	0.01	0.09	-0.13
Portugal	0.75	0.65	-0.30	0.39	0.01	0.34	0.04
Spain	0.53	0.51	-0.18	0.20	0.05	0.10	0.05
Sweden	-0.79	-0.13	-0.17	-0.49	-0.03	-0.33	-0.13
Switzerland	-0.19	-0.42	0.04	0.19	0.12	0.09	-0.02
Turkey	1.63	1.14	-0.52	1.00	0.10	1.03	-0.13
United Kingdom	-0.40	0.09	-0.14	-0.35	-0.09	-0.41	0.15
United States	0.18	0.49	0.13	-0.44	-0.20	-0.41	0.17

1. Deviations from OECD average

2. Including the effect of technology and price rebalancing

Table 4.6: Explaining Cross-Country Differences in Telecommunications Performance (Pooled Estimates)

Quality[1]

	Productivity	**Country Specific Effect**	**Economic Structure**[2]	**Regulation and Market Structure (a+b+c)**	Market Structure (a)	Liberalisation (b)	Ownership, Privatisation and Internationalisation (c)
Australia	-3.90	-8.08	0.83	3.35	0.17	2.85	0.34
Austria	0.90	1.47	1.09	-1.66	-0.17	-0.77	-0.72
Belgium	3.16	4.38	-0.38	-0.84	-0.25	-0.77	0.17
Canada	6.91	2.64	0.10	4.17	0.31	2.73	1.13
Denmark	4.83	5.07	-0.78	0.54	0.00	0.98	-0.44
Finland	-0.23	-1.78	-0.35	1.90	0.39	2.48	-0.97
France	5.82	6.63	-0.23	-0.58	-0.03	-0.64	0.08
Germany	0.52	0.01	0.80	-0.29	-0.03	-0.64	0.38
Greece	-20.17	-12.46	-1.12	-6.59	-0.03	-5.88	-0.69
Iceland	-8.59	-5.57	-1.18	-1.84	-0.39	-0.64	-0.80
Ireland	-0.02	0.83	0.46	-1.31	-0.17	-0.77	-0.37
Italy	1.71	1.57	0.74	-0.60	-0.10	-0.68	0.19
Japan	11.65	6.34	0.64	4.67	0.46	2.85	1.36
Luxembourg	4.55	6.04	0.51	-2.00	-0.39	-0.64	-0.97
Netherlands	8.17	9.09	-0.48	-0.44	-0.10	0.19	-0.53
New Zealand	-8.25	-12.38	0.47	3.66	0.25	2.85	0.55
Norway	-0.48	1.36	-0.20	-1.64	-0.03	-0.64	-0.97
Portugal	-8.70	-6.84	0.60	-2.46	-0.03	-2.39	-0.05
Spain	1.48	1.63	0.68	-0.84	-0.17	-0.68	0.02
Sweden	4.61	2.86	-0.69	2.44	0.09	2.31	0.04
Switzerland	1.30	2.05	1.00	-1.76	-0.39	-0.64	-0.72
Turkey	-17.86	-8.47	-1.94	-7.45	-0.32	-7.17	0.04
United Kingdom	2.51	-1.67	-0.53	4.71	0.30	2.85	1.56
United States	10.43	5.62	-0.04	4.86	0.63	2.85	1.38

1. Deviations from the OECD average
2. Including the effect of technology

These figures can be explained using New Zealand as an example. In New Zealand, the actual price of telecommunications services is below OECD average by 46% (represented by -0.46 in column one). This deviation can be primarily attributed to New Zealand's regulation environment and market structure, which accounts for 34% (represented by -0.34 in column four) of the deviation. Economic structure and country-specific effect will together account for the rest 12% deviation (column 2 + 3).

In Section 4.1, twenty-four OECD countries are separated into four groups according to their similarity in regulation and market structure based on cluster analysis. G2 is the most liberalised country group whereas G4 ranked second. G1 ranked third in the extent of liberalisation, and G3 ranked fourth. I intend to use this information on scatterplots to examine regulatory regimes (as represented by country groups) that deliver better performance. Four scatterplots are drawn based on column one (actual performance) and column four (performance as a result of regulation environment and market structure) for price-productivity and price-quality.

Figures 4.2 (price-productivity) and 4.3 (price-quality) are drawn using actual performance data. The countries of best performance in telecommunications services should lie on the quadrant that presents high productivity (or quality) and low price, while the countries of worst performance would lie on the quadrant that presents low productivity (or quality) and high price. In price-productivity (Figure 4.2), the group performance is not clear. G1 countries spread on all four quadrants. Belgium, Spain, Portugal and Ireland lie on the worst quadrant while the Netherlands is on the best. Among G2 countries, the United States and Australia are on the worst quadrant and none on the

Figure 4.2: Price and Productivity

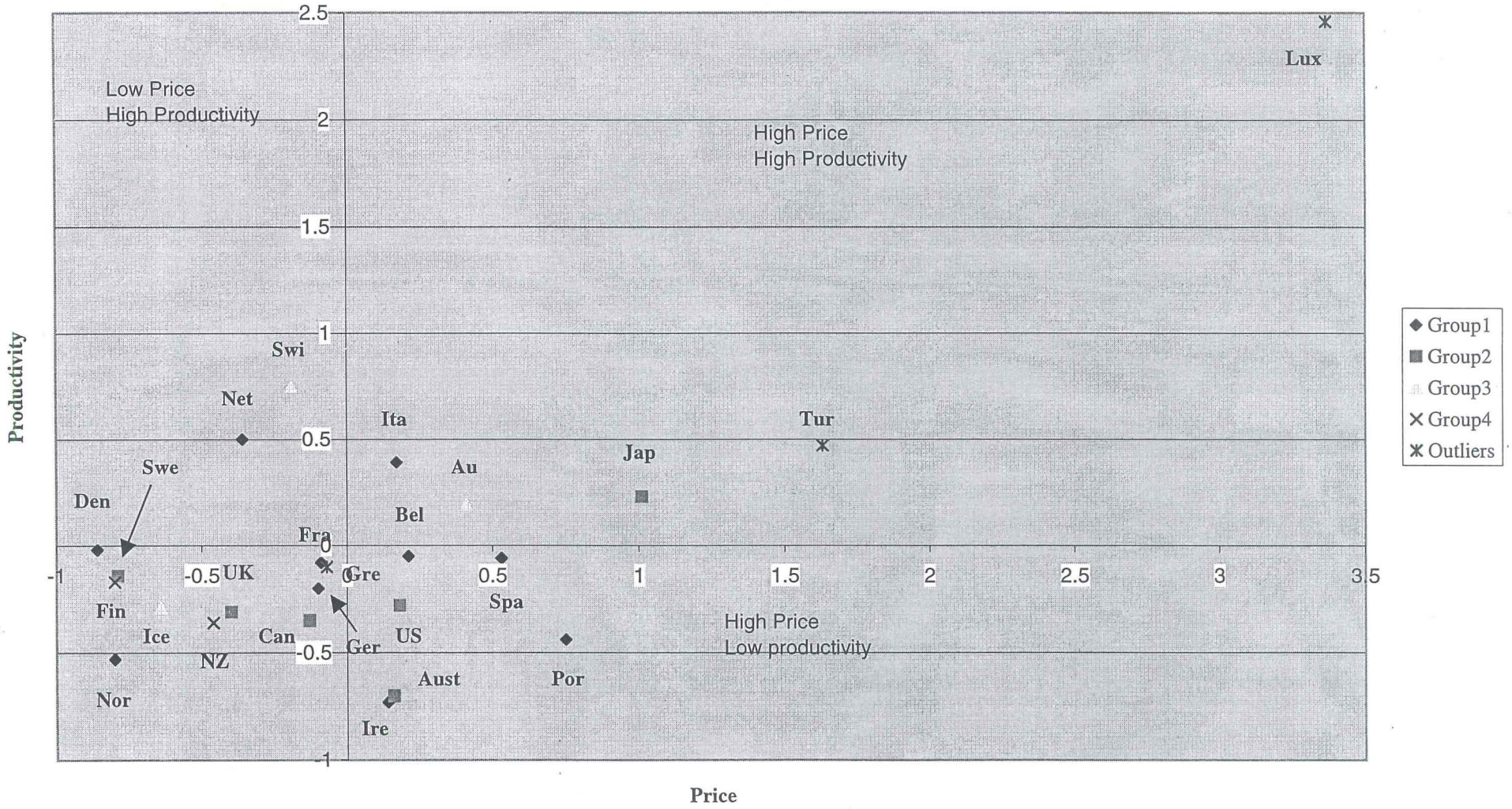
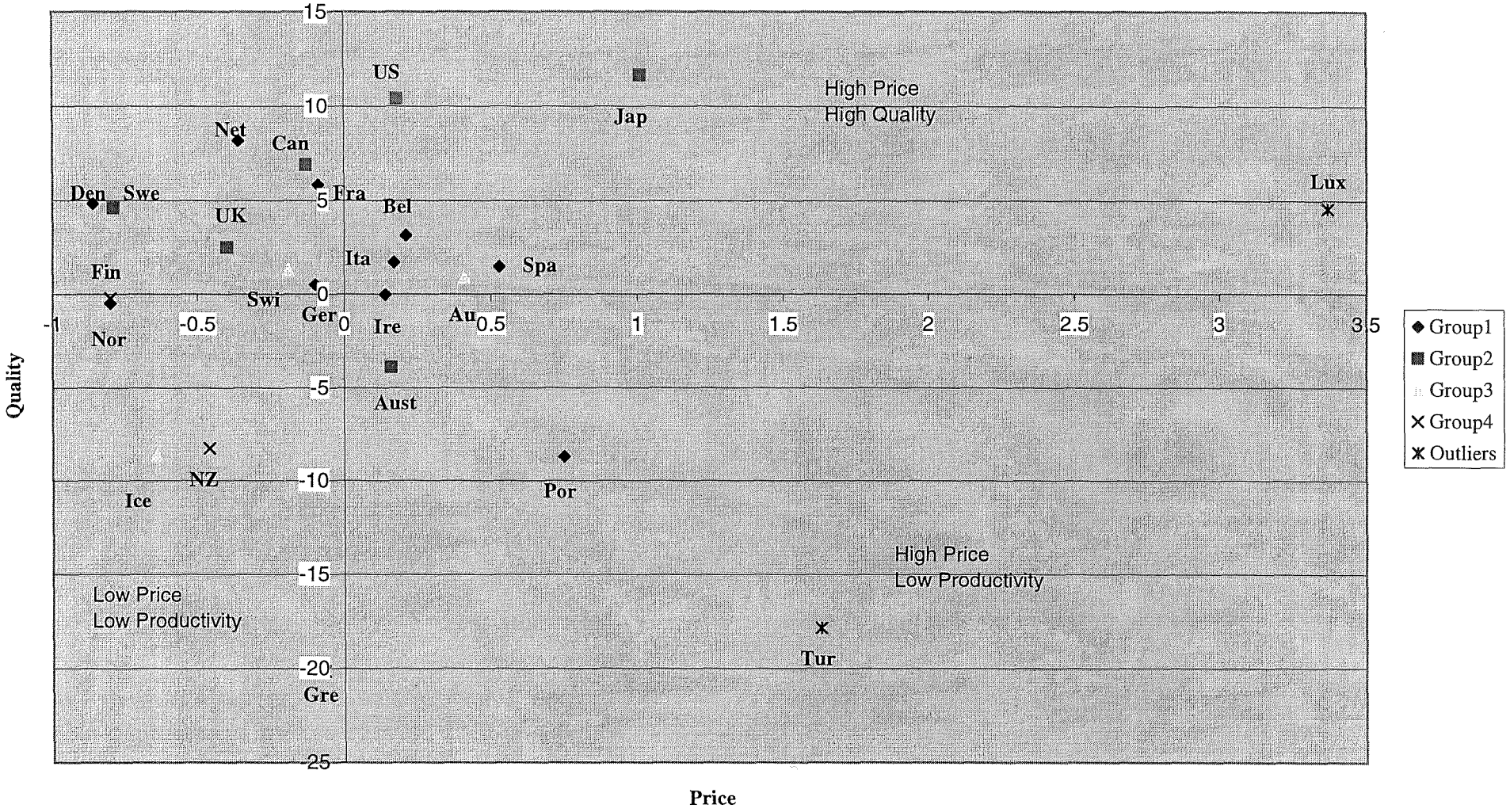


Figure 4.3: Price and Quality



best. The only G3 country, Switzerland, is on the best quadrant and none on the worst. G4 countries, Finland and New Zealand both have low price and low productivity. In price-quality (Figure 4.3), the group performance is again vague. G1 countries generally deliver good quality services, except Portugal. The Netherlands and Denmark are on the best quadrant and Portugal is on the worst. G2 countries generally give good performance in price and quality. Canada, UK and Sweden show good quality and low price. The only exception is Australia which has high price and low quality. G3 countries again spread on three different quadrants, Switzerland is on the best quadrant and none on the worst. In G4, Finland has low price and average productivity while New Zealand has low price and low productivity.

Figures 4.4 (price-productivity) and 4.5 (price-quality) are drawn based on the regression analysis in section 4.2. The effect of regulation and market structure on performance is singled out for its direct influence on performance. In Figure 4.4, it is clear to see that G2 countries generally outperform other country groups. All G2 countries are on the low-price high-productivity quadrant. G4 countries follow close by. Most G1 and G3 countries do not perform well, with the exception of Norway. G1 and G3 countries generally show higher price and lower productivity than OECD average, though the difference is not very significant. On average, G3 countries perform a bit better than G1. In Figure 4.5, the four country groups are either on the high-price low-quality or low-price high-quality quadrant. Both G2 and G4 countries are on the best quadrant. On average, G2 countries perform a little better than G4 countries. G1 and G3 countries are on the worst quadrant, with the exception of Norway and Denmark. G1 countries on average have better performance than G3 countries.

Figure 4.4: Adjusted Price and Productivity

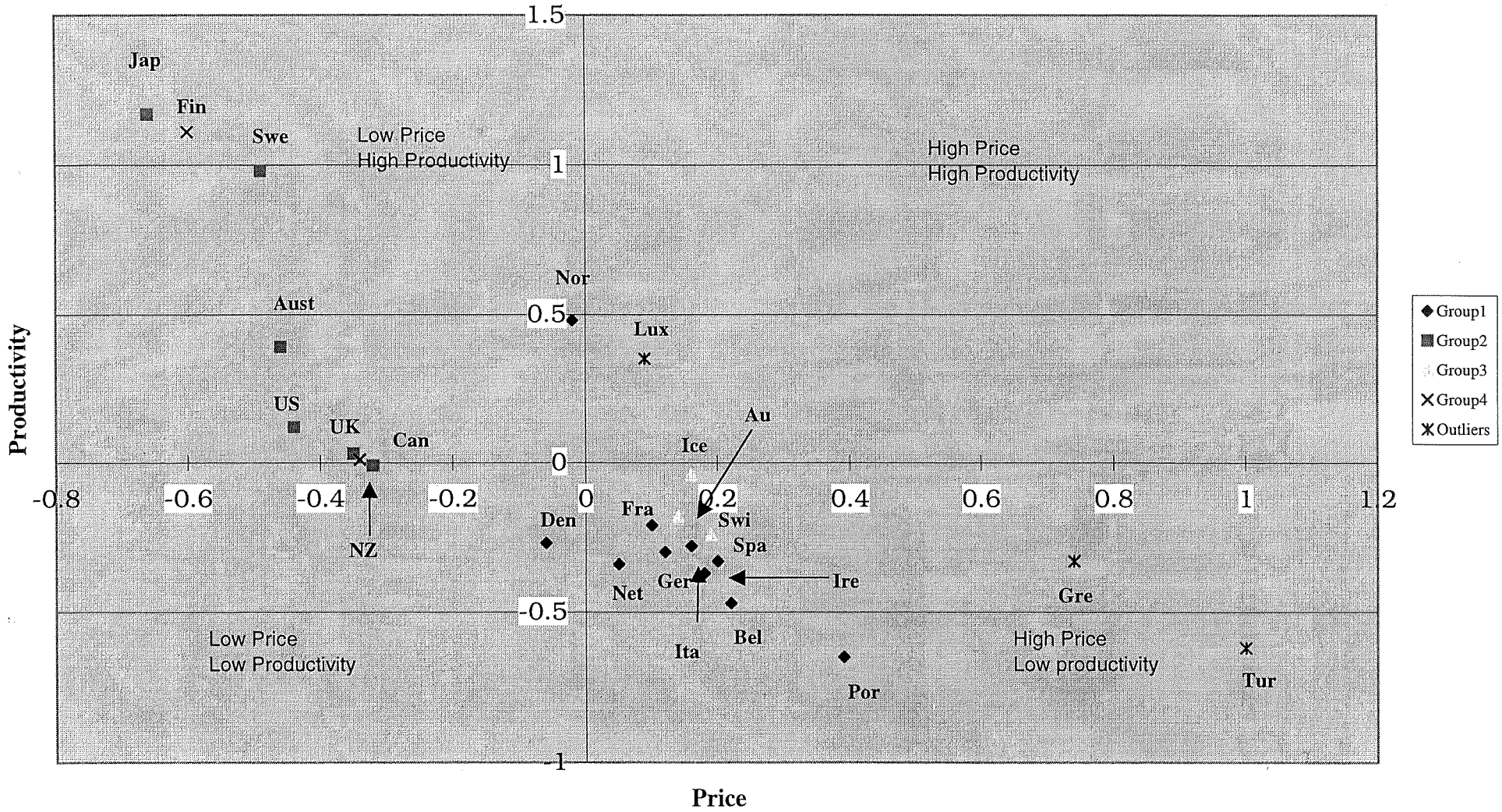
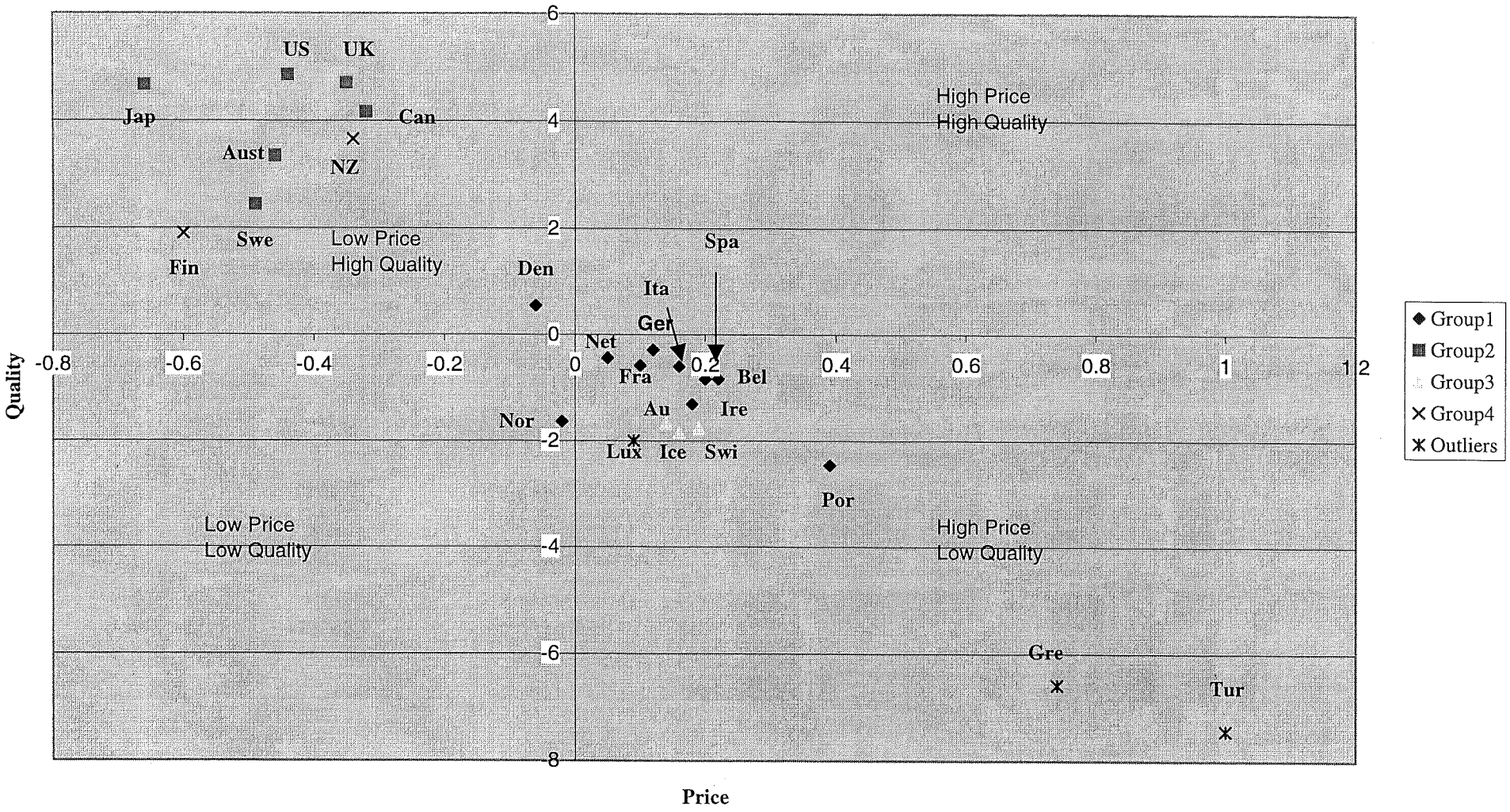


Figure 4.5: Adjusted Price and Quality



4.4 Conclusion

There is a significant difference between figures based on actual performance data and figures based on data resulting from the regression model. The actual performance of telecommunications services is subject to the state of influence factors such as regulation, market conditions, economic conditions, political environment, and level of technology of each individual country. However, the aim in this section is to find the relationships between regulation and performance of telecommunications services. For this purpose, the effect of "noise" factors – factors other than regulation that can influence performance – should be purged off the performance measure. Therefore, Figure 4.4 and 4.5 are more appropriate in representing the relationship between regulation and performance.

Figures 4.2 and 4.3 do not give clear pictures of the link between regulation and performance. The group performance and therefore comparison are hard to establish. However, in Figures 4.4 and 4.5, the relationships can be easily identified. In general, the more a country is liberalised, the better its telecommunications industry performs. This result provides a grand direction for the regulatory reforms especially to those countries that still maintain a statutory monopoly. Liberalising the telecommunications industry and therefore allowing the competition to emerge and to become effective improves telecommunications performance.

In the next chapter, I want to provide more information on the regulatory regimes of OECD countries. It is hoped that more insights on the link between regulatory regime and performance can be obtained from sources other than numerical analysis.

Chapter 5

Regulation in OECD Countries

In Section 4.1, twenty-four OECD countries were separated into four groups and three outliers according to their similarity in regulation and market structure. Indices were constructed for the factor and cluster analysis and other econometric tests. Although indices can be useful tools in analysis, they have their limitation in providing information on regulatory matters. Therefore, in this chapter, the regulatory settings of all OECD countries are explored to complement studies outlined in the last chapter and to give us a better view of what these indices are representing.

The main sources of regulatory setting used in this chapter are from Boylaud and Nicoletti (2000), OECD Secretariat and OECD Communications Outlook (1999). These source documents used information from the OECD (1998) survey of the regulation and market structure. Therefore, the discussions and descriptions are mainly based on 1998 and 1999 data with some current updates.

This chapter is organised as follows. The first section provides an overview of the regulatory practices, institutions and market structure of OECD member countries. The

following five sections are discussions and descriptions of each individual country's and the group of country's regulatory regimes and market structure. The precise details are in Tables 5.1-5.4. The last section is a short conclusion. Using the groups from Section 4.1, we can verify the raking of liberalisation as stated by Boylaud and Nicoletti (from the most to the least: G2, G4, G1, G3) and other information from the analysis.

5.1 Regulation and Market Structure of OECD Member Countries: An Overview

This section consist of two parts: regulation and market structure. The regulation part covers not only the long distance and mobile services, but also regulatory issues concerning local telephony. Local telephony is included due to its growing importance in competition. The market structure part discusses the market share of the dominant operators and its largest competitors and relates this to the regulatory structure in each country. All OECD countries are covered in this section.

5.1.1 Regulation

In the majority of countries, basic regulatory competencies (eg. licensing, regulations on interconnection and pricing, and regulation on service quality) are shared among three institutions: a ministry department, the sectoral regulator and the competition authority. OECD (1998) summarises the application of each regulatory institution among twenty-nine OECD countries in 1999. The study finds that competition authority, such as the Commerce Commission, is involved in carrying out regulation in 76%

of the countries. Ministry department also plays an important role in regulating the telecommunications industry (66%). Most countries have a sectoral regulator (86%) which is often independent of other government institutions. An independent regulator is adopted to govern the telecommunications sector, to shield the market from political interference, and to improve transparency, stability and expertise. An independent regulator is considered as an institution of modern regulatory governance, as opposed to the old system where the functioning of the regulation responsibilities was not structurally separated from the Ministry or other government departments. Although this form of governance is highly regarded, it is not immune from some problems that plague the old system, such as the risk of over-regulation. It creates a few new problems of its own. For example, coordination with other government departments becomes harder.

All member countries have given regulatory power for interconnection to the same institution that is responsible for retail price regulation. The United States is the only country where the regulatory supervision on interconnection is shared by a federal agency and state public utility commissions.

All OECD countries have significantly relaxed the legal barriers to entry. Only six countries still maintained legal monopoly in long distance services (trunk and international) in 1998. All countries' mobile markets are open to competition. However, many governments continue to more or less exercise control over major public telecommunications operators (PTOs). The control is exercised through the holding of shares, having special voting rights, etc. Foreign investment is restricted and supervised in many OECD countries.

Regulation on retail price and/or interconnection charges is common practice among

OECD countries. Retail price regulation is often incentive-based, usually through some kind of price cap mechanisms, while the interconnection charges are mainly cost-based. These price regulations apply to the incumbent PTOs or dominant operators instead of all operators in most cases. Therefore, interconnection agreements between two carriers without significant power are seen as a commercial matter while interconnection charges of operators with significant market power are subject to the authorisation of the regulator.

Privatisation of PTOs is not as obvious as liberalisation. In 1992, only four countries had fully privatised incumbent PTOs. In 1998, two more were added to the list of being fully privatised. The governments of the OECD member countries preserved significant shares of their dominant PTOs. In 1998, the average state shareholdings of PTO is 51.2%. Compared with 1992 statistics, which was greater than 77%, we can see that privatisation is still in progress.

5.1.2 Market Structure

Most incumbent PTOs still hold the majority of market shares in voice telephony (trunk and international). Therefore, the market share of the second largest operators rarely exceeds 20% for trunk and international services. In mobile (digital) services, however, the second largest operator has obtained significant market share, many over 30%. This may be attributed to the fact that mobile services are relatively new compared to basic voice telephony. Most countries have already undergone significant liberalisation of markets, and entrants can therefore start competing with the incumbent in the mobile market before the incumbent has a chance to obtain full market penetration.

In spite of the early introduction of competition in the 1980s, the market share of new entrants in the local market is not significant in Japan (< 7%) and the United States (< 5%). In the United Kingdom new entrants have an 18% market share in the local market, which makes the United Kingdom the only country where local competition has really taken off. In other member countries, the incumbent has more than 97% of the market share in local market, except Australia, Belgium, Denmark, and Austria where new entrants have approximately 3%-5% market share.

5.2 Group One Countries

There are ten countries that belong to group one: Italy, Spain, Belgium, Ireland, France, Germany, Portugal, Denmark, Netherlands and Norway. These European countries are all members of the European Union. The deregulation of these countries is characterised by a hierarchy of structure. The European Commission has defined the general principles for which each country's national regulatory agencies can implement with some degree of freedom. Full deregulation in telecommunications services has been in place since January 1, 1998. Therefore, it is no surprise that these countries have similar regulation and market structure.

There were no legal restrictions on entry into trunk and international services for G1 countries except for Portugal, which has licensed only one operator for providing trunk and international services. The entry condition in mobile services (digital) has been limited by spectrum in most G1 countries, which means that entry is only conditional on the availability of frequencies. Entry conditions on mobile are relatively loose compared to the licence requirements in trunk and international services in some

countries. However, in Italy and Spain, the market is restricted to a duopoly structure. France, Germany and Portugal have had particularly liberal mobile environments, but restrictive fixed telephony environments. Most countries in G1 liberalised the trunk and international services prior to 1998 with the exception of Portugal. The mobile services of all G1 countries were liberalised during the 1989 - 1996 period. The state control of PTO is widespread. The number of foreign telecommunications operators participating in joint ventures or other co-operation agreement with the domestic market is usually between one to four.

G1 countries are rated as the third most liberalised country group. Entry in general is not restricted. Mobile services were liberalised in the early 1990s, new entrants have obtained thirty to fifty percent of the market (digital). The liberalisation of the trunk and international services occurred in the late 1990s. New entrants have only obtained insignificant market share in both trunk and international services. This shows that liberalisation policy takes time to transform the market structure and to enhance competition. It may also suggest that other means of regulation can be employed, such as cost-oriented LRIC interconnection principle, to intensify competition.

5.3 Group Two Countries

There are six countries that belong to Group Two. They are Canada, Japan, United Kingdom, United States, Australia and Sweden. These countries lead the way of deregulation.

There are no legal restrictions to entry for either trunk or international services in all G2 countries. The mobile services were limited by spectrum only. The G2 countries

liberalised all three services quite early. Japan, UK and US started the liberalisation process in the 1980s. Australia, Canada and Sweden followed closely and liberalised the provision of telecommunications services in the early 1990s. The number of foreign telecommunications operators involved in the domestic market in G2 countries was the highest among all country groups. This can be attributed to the fact that they liberalised at an early stage and therefore the competition was initiated earlier or the fact that restrictions on foreign investors are not so strict as the other country groups. Still, state control was apparent in G2 countries.

G2 countries largely were first-movers in regulatory reform in telecommunications, as they all liberalised telecommunications services well before mid 1990s. The vast reform movements have stimulated competition in the industry, which has had direct impacts on the market structure. The minimal legal restrictions on entry have induced many entries into the market. Price regulation applies mostly to the incumbent PTOs to curtail the competitive advantage that the incumbent inherited from its having been the statutory monopoly in the past.

5.4 Group Three Countries

There are only three countries in Group Three: Austria, Switzerland and Iceland.

No legal restrictions on entry were imposed on any G3 country in trunk and international services. The mobile services are limited by spectrum. All telecommunications services of G3 countries were liberalised in the late 1990s. Austria is the only country that has no restrictions concerning PTO (for instance, the special voting rights of the government).

G3 countries ranked the last in the degree of liberalisation. The liberalisation of all telecommunications services took place in the late 1990s. There was no evidence to show that the liberalisation policy has made an impact on market structure yet, although the entry to the market is relatively free now.

5.5 Group Four Countries

Only two countries belong to Group Four: New Zealand and Finland.

The two G4 countries have not set legal restrictions on entry for trunk and international services. In Finland, the mobile services are limited by spectrum. In New Zealand, only two operators provided mobile services. To operate mobile networks in New Zealand, operators are required to obtain management rights, which are sold by public auction and are tradable in the market. The liberalisation of all three services occurred during the early 1990s and state control is still practised in both countries. In New Zealand, such control is managed through the so called "Kiwi Share". The maintenance of such special shares is to secure the social goals of the government.

The G4 countries represent the second most liberalised country group. These two countries are among the first-mover countries in liberalisation. However, due to a low degree of internationalisation and a low number of competitors in the mobile market, they are not as liberal as G2 countries. The entry restrictions are loose and new entrants have gained sizeable market share in trunk, international and mobile services. The analogue technology in mobile services, however, continues to be operated purely by the dominant incumbent in both countries.

5.6 Outliers

The outlier countries categorised here are Greece, Luxembourg and Turkey. Although these three countries are deemed dissimilar in regulation and market structure by cluster analysis, for simplicity, discussions of the regulation and market condition of these three countries are placed under the same heading.

In Greece and Turkey, the telecommunications market of trunk and international services was dominated by its statutory monopoly. Luxembourg liberalised in 1998 and therefore its trunk and international services are now open to competition by new entrants. Greece planned to start the liberalisation process in the year 2001 and Turkey may liberalise its telecommunications industry in the near future. Greece has particularly liberal environments in mobile telephony, but restrictive fixed telephony environment. In Luxembourg the degree of internationalisation and the number of competitors in the mobile market were low. State control of the PTO exists in all three outlier countries. The state shareholdings of the dominant PTO in 1998 was 100% in Luxembourg and Turkey and 65% in Greece.

5.7 Conclusion

The country groups with more liberal regulatory environment and market structure in general give better performance in terms of low-price high-productivity and low-price high-quality combinations. This relationship resulting from numerical analysis is verified with the examination of the actual regulatory environment and market structure in the OECD member countries. The regulatory experiences and conditions of the

OECD member countries provide a nice case study for the regulation and competition issues. Competition bridges the link between regulation and telecommunications services performance. Regulation that induces and facilitates competition without creating too much market distortion appears to work the best to achieve efficiency gains in the telecommunications industry.

Table 5.1: Regulation of Entry and Foreign Investment, 1998

	Legal Restrictions of Entry			Year of liberalization			Foreign investment	
	Trunk	International	Mobile	Trunk	International	Mobile	no. of competitors	Restriction concerning PTO
GROUP1								
Belgium	open	open	limited by spectrum	98	98	96	3	State control
Denmark	open	open	limited by spectrum	96	96	< 92		No
France	open	open	limited by spectrum	98	98	89	3	State control
Germany	open	open	limited by spectrum	98	98	91	4	State control
Ireland	open	open	limited by spectrum	98	98		1	State control
Italy	open	open	duopoly	98	98	94	3	Yes
Netherlands	open	open	limited by spectrum	97	97	95		Yes
Norway	open	open	limited by spectrum	98	98	92		Yes
Portugal	license one firm	license one firm	limited by spectrum	2000	2000	91	2	No
Spain	open	open	duopoly	98	98	94	2	Yes
GROUP2								
Australia	open	open	limited by spectrum	91	91	92	4	Yes
Canada	open	open	limited by spectrum	90	92		5	
Japan	open	open	limited by spectrum	86	87	87	9	State control
Sweden	open	open	limited by spectrum	94	92	86	4	State control
UK	open	open	limited by spectrum	85	86	84	7	Yes
US	open	open	limited by spectrum	84	84	83	6	
GROUP3								
Austria	open	open	limited by spectrum	98	98	95/96		No
Iceland	open	open	limited by spectrum					State control
Switzerland	open	open	limited by spectrum	98	98	98		State control
GROUP4								
Finland	open	open	limited by spectrum	93	93	<92		Yes
New Zealand	open	open	duopoly	90	90		3	Yes
Outliers								
Greece	license one firm	license one firm	limited by spectrum	2001	2001	93	1	State control
Luxembourg	open	open	duopoly	98	98	98		State control
Turkey	license one firm	license one firm	limited by spectrum	2006	2006	97/98	4	State control

Sources: OECD Communications Outlook; OECD International Regulation Database

Table 5.2: Market Structure, 1998

	Basic voice telephony: trunk			Basic voice telephony: international			Mobile cellular telephony: analogue			Mobile cellular telephony: digital		
	Number of license holders	Share of largest operator	Share of second largest operator	Number of license holders	Share of largest operator	Share of second largest operator	Number of license holders	Share of largest operator	Share of second largest operator	Number of license holders	Share of largest operator	Share of second largest operator
Group1												
Belgium	7	100	0	7	100	0	1	100	0	2	67	33
Denmark	8	95		8	75		1	100	0	4	53	
France	13	100	0	14			2	64	36	3	53	38
Germany	21	100	0	21	100	0	1	100	0	4	44	43
Ireland	1	100	0	1	100	0	1	100	0	2	65	35
Italy	4	100	0	4	100	0	1	100	0	2	66	
Netherlands	3	80		3	80		1	100	0	6	64	30
Norway		100	0		95		1	100	0	3	75	
Portugal	1	100	0	1	100	0	1	100	0	3	50	
Spain	3	97	3	3	97	3	1	100	0	2	70	30
Group2												
Australia	11	82	16	11	63	22	2	70	30	3	48	33
Canada	13			14			2			10		
Japan	15	64		21	64		18	51		30	51	
Sweden	15	83		15	68		1	100	0	4	49	
UK	>20	76	10	7	49	16	2			4	34	
US	621	62		346	49	27	2			6		
Group3												
Austria	11	100	0	13	100	0	1	100	0	3	80	20
Iceland	1	100		1	100	0	1	100	0	2	100	0
Switzerland	12	100	0	12	100	0	1	100	0	3	100	0
Group4												
Finland	20	55	40	16	66	24	1	100	0	2	69	31
New Zealand	7	77	18	15	72	20	1	100	0	2	83	
Outliers												
Greece	1	100	0	1	100	0	0			3	53	47
Luxembourg	1	100		1	100	0	0			2	100	0
Turkey	1	100	0	1	100	0	1	100	0	2	75	25

Sources: OECD Outlook; Oecd International Regulation Database

Table 5.3: Ownership and Privatisation of PTOs, 1998

	PTO	State shareholdings(%)		Year of privatisation
		1992	1998	
Group1				
Belgium	Belgacom	100	51	1995
Denmanrk	Tele Denmark	89	0	1992
France	France Telecom	100	62	1997
Germany	Deutsche Telekom AG	100	61	1996
Ireland	Telecom Eireann	100	80	1996-97
Italy	Telecom Italia	>50	5	1998
Netherlands	KNP Telecom NV	100	43.8	1994
Norway	Telenor	100	100	
Portugal	Telecom Portugal	100	25	1995
Spain	Telefonica	35	0	1997
Group2				
Australia	Telstra	100	67	1996-97
Canada	stentor	0	0	
Japan	NTT	>66	65	1986
Sweden	Telia	100	100	
UK	British Telecom	22	0	1984
US	Baby Bells	0	0	
Group3				
Austria	Post and Telekom Austria AG	100	100	1998
Iceland	Telecom Iceland	100	100	
Switzerland	Swisscom	100	100	1998
Group4				
Finland	Sonera	100	78.8	1998
New Zealand	Telecom New Zealand	0	0	1990
Outliers				
Greece	OTE	100	65	
Luxembourg	PT Administration	100	100	
Turkey	Turk Telekomunikasyon	100	100	
Average		79.4	54.3	

Source: OECD Communications Outlook; OECD International Regulation Database

Table 5.4: Price Regulation (Retail)

	Retail prices	
	Basic voice telephony (trunk and international)	Mobile cellular telephony
Group1		
Belgium	objective benchmark Reg. applies to the DOs	objective benchmark Reg. applies to all operators
Denmark	objective benchmark Reg. applies to the incumbent PTO	
France	objective benchmark Reg. applies to the incumbent PTO	No regulation
Germany	Discretionary (tariff approval) Reg. applies to the DOs	obj. bench.&cost of the operator Reg. Applies to the DOs
Ireland	objective benchmark Reg. applies to the incumbent PTO	No regulation
Italy	cost of the operator Reg. applies to the DOs	No regulation
Netherlands	objective benchmark Reg. applies to the incumbent PTO	No regulation
Norway	cost of the operator Reg. applies to the DOs	cost of the operator Reg. applies to the DOs
Portugal	objective benchmark Reg. applies to the incumbent PTO	No regulation
Spain	Reg. of some prices Reg. applies to the incumbent PTO	No regulation
Group2		
Australia	objective benchmark Reg. applies to the incumbent PTO	objective benchmark Reg. applies to the incum. PTO
Canada	objective benchmark Reg. applies to the incumbent PTO	No regulation
Japan	objective benchmark (local) Reg. applies to the incumbent PTO	Reg. of some prices Reg. applies to all operators
Sweden	cost of the operator	
UK	objective benchmark Reg. applies to the incumbent PTO	
US	Objective benchmark (local)	No regulation
Group3		
Austria	Discretionary Reg. Applies to the DOs	No regulation
Iceland		
Switzerland	Trunk: Objective benchmark Reg. Applies to the incumbent PTO	
Group4		
Finland	No regulation	No regulation
New Zealand	objective benchmark (residential)	
Outliers		
Greece	objective benchmark Reg. applies to the incumbent PTO	
Luxembourg		
Turkey	Discretionary (tariff approval) Reg. applies to the incumbent PTO	objective benchmark Reg. applies to the DOs

Source: OECD secretariat

Table 5.4: Price Regulation (Interconnection)

	Interconnection or access charges		
	Basic voice telephony (trunk and international)	Mobile cellular telephony	Mandatory requirements to publish interconnection or access charges
Group1			
Belgium	cost of the operator Reg. applies to the DOs		Yes
Denmark	cost of the operator Reg. applies to the DOs	No regulation	No
France	cost of the operator Reg. applies to the DOs	No regulation	Yes
Germany	cost of the operator Reg. applies to the DOs	cost of the operator Reg. applies to the DOs	Yes
Ireland	cost of the operator Reg. applies to all operators	cost of the operator Reg. Applies to all operators	
Italy	objective benchmark Reg. applies to the incumbent PTO	objective benchmark Reg. applies to the DOs	Yes
Netherlands	Trunk:cost of the operator Reg. applies to the incumbent PTO		Yes
Norway	cost of the operator Reg. applies to the DOs	cost of the operator Reg. applies to the DOs	
Portugal	cost of the operators	cost of the operators	Yes
Spain	cost of the operator Reg. applies to the incumbent PTO	cost of the operator Reg. Applies to all operators	Yes
Group2			
Australia	commercial agreement or access undertaking approved by regulator	commercial agreement or access undertaking approved by regulator	No
Canada		No regulation	Yes
Japan	objective benchmark Reg. applies to all operators	objective benchmark Reg. applies to all operators	Yes
Sweden	cost of the operator Reg. applies to all operators	cost of the operator Reg. applies to the DOs	Yes
UK	objective benchmark Reg. applies to the incumbent PTO	cost of the operator Reg. applies to the DOs	Yes
US	Obj. bench. & cost of the operator Reg. applies to the DOs	cost of the operator Reg. applies to the DOs	Yes
Group3			
Austria	cost of the operator Reg. applies to the DOs	No regulation	Yes
Iceland			
Switzerland			Yes
Group4			
Finland			Yes
New Zealand	objective benchmark Reg. applies to the DOs	objective benchmark Reg. applies to the DOs	Yes
Outliers			
Greece	No regulation	No regulation	No
Luxembourg			
Turkey	cost of the operator Reg. Applies to the incumbent PTO		No

Source: OECD secretariat

Chapter 6

New Zealand Telecommunications

6.1 Economic Background of Deregulation for SOEs

New Zealand is a small, open economy. International trade is therefore of great importance for the well-being of the New Zealand economy. During the 1970s and 1980s, pastoral products were the main source of export revenue, which made the New Zealand economy an easy prey to demand shocks that affect international commodity prices. In 1974 and 1979 respectively, two major oil crises severely disrupted the normal function of the world economy and the New Zealand economy was no exception. The skyrocketing oil prices pushed up all input prices, which had detrimental effects on both demand and supply sides of the economy. The two oil crises forced the world economy into recession. The adverse effects continued into the 1980s. Britain's entry into the European Community and weak food commodity prices prevailing at the time hit New Zealand exports exceptionally hard. The New Zealand government initially confronted the problem by conducting policies that increased energy self-sufficiency, by seeking new export

markets and by promoting export product diversification. However, these policies were insufficient to restore the economy to its former strength. A large proportion of economic activities, especially those that were not export-related, were under no pressure to perform well or to actively engage in efforts to reduce costs. This so-called x-inefficiency can been seen as *"the difference between actual cost and minimum attainable cost resulting from any reduction of the pressure on firms to apply maximum effort in pursuit of efficiency and profits... is the difference between maximum and actual performance"* (Hay and Morris, p297). It was believed that eliminating such inefficiency among many industry sectors could strengthen the economy. Many companies in the private sector undertook major reforms of their organisations, production processes, and accounting practices, etc to lower inefficiency in their operations during that period. The poor economic performance of government-owned enterprises was well known and they therefore were the targeted area for efficiency improvement. The government of New Zealand started to make amends by deregulating and privatising state-owned enterprises. The legal barriers that prohibited competitors from entering the market were removed. The government gave competition a crucial role in improving efficiencies and in increasing consumer surplus. Competition was introduced into many markets that were formerly dominated by a state-owned monopoly, including the telecommunications industry.

6.2 First Telecommunications Industry Reform

The only carrier in the provision of public telecommunications services in New Zealand prior to the deregulation was the New Zealand Post Office. Its businesses included postal operations, telecommunications and banking. For telecommunications,

it enjoyed a statutory monopoly with vertical control over terminal equipment, local exchange services, and both national and international long distance services. In July 1987, Touche Ross Management Consultants were commissioned by the government to report on whether competition should be introduced into the network industry by loosening the government's strict control of the market. The main focus was laid on the possible net economic efficiency gains such changes might bring to New Zealand. Several shortcomings of Telecom's operations were also identified in the report and greater competition was recommended. Those shortcomings included at least the following. Its operations were not market-driven; in comparison with other telephone companies overseas, it performed quite inefficiently and its management system was vastly inadequate. The existence of large cross subsidies implied the potential for large price reductions especially in the long distance markets with the introduction of competition. Following the report, the government of New Zealand decided to introduce competition into telecommunications service network by allowing more network service providers to take roles in the market.

On 1 April 1987, Telecom Corporation of New Zealand Ltd (Telecom) was formed by separating the telecommunications element of the New Zealand Post Office from the rest of its operations. The regulatory and policy advice responsibilities for telecommunications and radio spectrum management rested on the Department of Trade and Industry, which became the Ministry of Commerce on 1 December 1988 and, which became the Ministry of Economic Development in February 2000. From 1 October 1987 to 1 April 1989, the supply of telecommunications customer premises equipment was progressively deregulated. On 1 April 1989, all legal restrictions on entry into the telecommunications

service market in New Zealand were removed. In September 1990, the government privatised Telecom by selling it to a consortium led by Ameritech of Chicago and Bell Atlanta of Philadelphia. In November 1990, Clear Communications Ltd (Clear) was registered as a network operator. It then engaged actively in negotiations and in litigations with Telecom for interconnection agreements that would provide a "level playing field" for many years. With the conclusion of the first interconnection agreement in March 1991, competition was initiated.

6.3 Regulatory Environment of First Reform

New Zealand government adopted light-handed regulation for the telecommunications industry based on the concept that competition can carry out many functions often carried out by regulatory means, such as retail price regulation. The main features of New Zealand's "light-handed" regulatory environment are described in what follows. The first feature is that there are no controls on entry. Obtaining a license is not compulsory for companies who intend to supply telecommunication services, and the number of network service providers allowed to enter the market is not constrained. However, it may be beneficial to obtain a "Network Operator Status", which presents the network operators with a right to apply for a court order if need arises when installing telecommunications plant on public and private property. The second feature is that there is no industry specific regulator. This has the advantage of saving the fiscal cost of a specific regulator. It allows concentration of expertise in the general enforcement body – New Zealand Commerce Commission. Furthermore, the regulatory environment relies primarily on competition law, the Commerce Act 1986, to deal with

anticompetitive behaviour. The key provisions are the prohibition of mergers that create or strengthen a dominant position in a market (Section 47); exclusionary behaviour by dominant firms (Section 36); and agreements that substantially lessen competition (Section 27). The Telecommunications Inquiry suggested the strengthen of the Commerce Act, for which the government decided to adopt. Section 47 will be used to prohibit mergers that have the effect of substantially lessening competition, rather than forming a "dominant position". This aligns section 47 with section 27 in application. Section 36 will apply to any practices that might take advantage of an operator's substantial degree of market power, instead of merely focusing on the use of an operator's dominant position. The applicability of the Commerce Act was widened by such a change, which gives it a greater role in preventing anticompetitive behaviour. The fourth feature of New Zealand's regulatory environment is that Telecom has to disclose information including the standard price, terms and conditions of a prescribed set of services offered, offers of discounts in excess of 10% and interconnection agreements reached with its competitors. Starting from year 2000, Telecom is also required to publish twice a year the separate financial statements and financial performance measures for its "local loop" and "other telecommunications" businesses. The cost of complying with "Kiwi Share" obligations on a forward-looking basis has to be included in such publications. The disclosure of this information is meant to provide a supplementary role to assist interconnection negotiations. It is intended to redress problems of asymmetric information between negotiating parties that produce unequal bargaining power. The fifth feature is that there is no price control, except in relation to domestic customers' access charges under the "Kiwi share" obligations. The "Kiwi share" prohibits Telecom from

increasing the real value of its pre-GST rental rate beyond its level in 1 November 1989 unless the profits of Telecom are unreasonably impaired. The real price calculation is based on the All Groups Consumer Price Index (CPI), which can be obtained from New Zealand Department of Statistics. The sixth feature is that there is a threat of introduction of other regulatory measures, such as imposing price control. In December 1991, the Minister of Communications issued a statement of its policy toward the development of competition in telecommunications markets in New Zealand. The statement declares the government's goal to develop an efficient telecommunications industry and highlights the need to allow new entrants access to the incumbent's network. It requires the parties involved to make genuine efforts to reach an agreement on interconnection. If the current regulatory regime fails to deliver a satisfactory outcome relating to the government's goals further regulatory measures may be brought in .

There was no industry-specific regulator to look after telecommunications industry from the first regulatory reform in New Zealand. The general regulatory duties were rested upon the Ministry of Economic Development, the New Zealand Commerce Commission and the courts. The resource and network branch of the Ministry of Economic Development was responsible for advising the government on the regulatory policy for the telecommunications sector. The Commerce Commission, on the other hand, enforced the Commerce Act. Disputes between network service providers that could not be resolved through commercial negotiations were taken to the courts and tried on general competition law.

It became clear that the implementation of light-handed regulations was not able to fully satisfy the New Zealand government's goals. This dissatisfaction arose mainly

because of the delay involved in reaching agreement or having the disputes settled by the courts. Therefore the government established an Inquiry to assess the current regulatory arrangements and explore amendments that might help to achieve the government's objectives, which are to *"ensure that the regulatory environment delivers cost-efficient, timely, and innovative telecommunication services on an ongoing, fair and equitable basis to all existing and potential users"*. Details of the Inquiry and the government's decision concerning the change of regulatory regime will be discussed in greater length in Sections 6.8 and 6.9.

6.4 First Interconnection Negotiations and Litigations (Clear vs Telecom)

Clear was the first entrant and thus the first network service provider to negotiate interconnection with Telecom. It proposed that the interconnection charges should be based on incremental costs of providing the services, with payments between two companies on a reciprocal basis. Telecom proposed that interconnection pricing should be based on Efficient Component Pricing Rule (ECPR), also called Baumol-Willig (BW) pricing rule. According to ECPR, Clear would have to pay Telecom the incremental costs of supplying access plus any opportunity costs incurred caused by new entrants, which also include the incumbent's foregone monopoly profits. After long and frustrating negotiations, it turned to the courts for dispute resolution on the principles of pricing of interconnection. Clear sued Telecom on the grounds of violating the competition law. It intended to prove that Telecom was in breach of Section 36 of the Commerce

Act, which is concerned with the use of dominant position for exclusive behaviour. The litigations, which took five years starting from 1991 to 1996, were tried in three courts– the High Court, the Court of Appeal and the Privy Council. Telecom did not, in the eyes of the Privy Council, violate Section 36 of the Commerce Act by adopting ECPR. The Privy Council gave the use of ECPR as the basis of interconnection pricing a legal stand. After the ruling, a discussion paper by the Ministry of Commerce and Treasury noted *"The BW rule was solely designed to achieve the goal of productive efficiency. In the simplest, static and no-uncertainty context the rule achieves this goal. However, if other factors are introduced such as uncertainty and sunk costs, or if the dynamic benefits of competition are considered, the BW rule may, in fact, deter efficient entry"*. It pointed out the long run economic side effects with arbitration supporting the use of ECPR. The government stated that it opposed to the use of ECPR because it had the potential to hinder competition. Under pressure from the government the access prices agreed between two participants at the end were less than implied by the ECPR. The directed costs of the disputes estimated and reported in the Inquiry's final report were NZD 5-10 million.

6.5 Main Competitors of Telecom in Telephone Network

Clear was the main competitor of Telecom in long distance call market. It was therefore the main contributor in price reduction in telecommunications services in New Zealand. It held about 18% of the provision for domestic toll services and 20% of

international toll services. In mobile telephony, Telecom and Vodafone (or Bellsouth NZ prior to the acquisition in November 1998) operate the only cellular mobile telephone networks in New Zealand. Telecom operates a combined first (analogue) and second (digital) generation network whereas Vodafone's network makes use of second-generation technology only. Vodafone captures about 34 % of the mobile market. The first residential local wireline competition in New Zealand was initiated by Saturn in May 1998. Saturn entered the residential local telephony market by duplicating the local loop which enables it to compete with Telecom for local access. However, Saturn still had to interconnect with Telecom's local loop. Saturn's network is concentrated in the Wellington area. In April 2000, it merged with Telstra New Zealand to form a 50:50 joint venture. The company, TelstraSaturn, entered into the Christchurch and Auckland markets to complement its Wellington network.

In December 2001, both the Overseas Investment Commission and New Zealand Commerce Commission approved the acquisition of Clear by TelstraSaturn. The newly created entity is called TelstraClear. The integration process of the two carriers is expected to take around twelve months. TelstraClear will be the second largest full service carrier in New Zealand.

The relationship between carriers is not clear-cut. They may compete with each other in prices and quality of final services in order to attract a greater customer base; they may form alliances in order to extend their networks and/or to provide more services to their customers. Carriers would like to be able to provide their customers with a full range of services to meet any needs that may arise. They can also bundle their services to extract greater profits. This one-stop-shopping concept underlies the movements of

alliances and mergers in the industry.

The relationship between the entrants and the incumbent, Telecom, is somewhat hostile. Telecom is the sole supplier of the entrants' essential intermediate input – interconnection. The entrants are Telecom's customers and also its competitors. The competitive environment for final services tainted the seller-buyer relationship of the incumbent and the entrants. The pricing principles and terms and conditions for interconnection proposed by Telecom would severely disadvantage the entrants. The entrants have recourse to the courts to solve the problem, but the courts may not have the expertise for the task. The years-long litigation creates tension in the industry.

6.6 Key Benefits of the Reform

The Ministry of Commerce (now called the Ministry of Economic Development) in its 1995 study lists four major benefits for telecommunications services from the the first regulatory reform. The first benefit is that advanced services are now available, such as Integrated Services Digital Network (ISDN), frame relay, call diversion, interactive voice response systems, audio and video conference services; 0800 toll free calls and 0900 pay calls are convenient for business' sake. Furthermore, more personal services are available for normal network users, including call minder and the initial offering of Personal Communications Service (PCS). The second benefit is that the reform has brought in large capital investments by network providers. Total capital investment in telecommunications by Telecom, Clear and Bellsouth from 1987 to 1995 exceeds NZD6,600 million. The ongoing investors in the telecommunications market are primarily BCL, Global One, Clear, TelstraSaturn (or TelstraSaturn), TeamTalk, Telecom NZ, Vodafone

and WorldxChange. The third benefit is that the customer services such as customer inquiry answering services and fault clearance have greatly improved. The fourth and last benefit is that prices have been largely reduced since early 1991 and more price plans are available to the customers.

Outside the four key benefits mentioned above, the boost in the telecommunications industry has brought a great many employment and business opportunities. The industry has trained its employees and this has enriched New Zealand's human resources. The better and more advanced telecommunications services have allowed New Zealand to lessen its geographical isolation. New Zealand businesses can conduct business with overseas companies with ease. Furthermore, the benefits brought by the flow of information and knowledge are invaluable.

The improvement in the variety of services available and the decline in prices have greatly increased consumer welfare. Boles De Boer and Evans (1996) have estimated the productivity and changes in consumer and producer welfare in the New Zealand telecommunications network market between 1987, when it was deregulated, and 1993. The surplus gain for residential customers is estimated to be 251.7million−307.93 million and the surplus gain for business customers is estimated to be 287.3million−348.02 million (data are in 1987 prices). The capital investment has secured the future development of the telecommunications industry. The network service providers tailor their services to meet both general and specific market demand for niche markets. Maurice Williamson in his speech (Minister of Communications) for New Zealand Telecommunications Summit commented on the productivity improvement: "Major operational efficiencies have been reached...for a start, Telecom's productivity has soared. From 115

lines per operating employee in March 1991, it has reached 250 in March 1996". It is clear that the goal of greater production efficiencies was met since deregulation.

6.7 Price and Productivity

The OECD has established a methodology for comparing telephone charges across OECD countries. This methodology is based on a representative basket of component services and quantities in telephony. According to the November 1999 results, New Zealand has the sixth lowest residential prices and the twenty-second lowest business prices among the twenty-nine countries. Furthermore, New Zealand has the seventeenth lowest mobile prices among the twenty-seven OECD countries offering mobile services. Since high ranking means high tariff for that service, there is still room for the price of business telephone and mobile services to fall. Although the reform has brought vast benefits to society, the international comparison suggests that further benefits can still be obtained. Therefore, more measures are required to intensify competition.

Some complaints about the old regulatory regime are widely discussed among economists, competing network operators and government officials. It is believed that settling disputes by courts is time consuming and the resolution process of this kind can be used by the incumbent to deter and delay entry. The cost of litigations is high and the uncertainty surrounding the industry before the final verdict is enormous. These factors have adverse effects on the creation of effective competition. A modification of the existing regulatory regime that can resolve technical problems and disputes in a timely fashion may bring higher benefits in the future.

6.8 Telecommunications Inquiry

In February 2000, the government established a Ministerial Inquiry to examine regulatory arrangements for the New Zealand telecommunications sector. Although the broad aim of the Inquiry was to assess the extent to which the old regulatory regime meets the government's objective for the telecommunications sectors, there were specific issues that the government would like examined. These issues include the following. The Inquiry should examine the environment for interconnecting supplies with Telecom's network; it should look into the Kiwi Share Obligations and to upgrade and redefine necessary stipulations so that they were applicable in today's environment; it also has to examine what way or form of regulation would best suit to arrange the telephone number portability and administration. A three-person team chaired by Hugh Fletcher ran the Inquiry, which adopted a public consultation process. It proposed a light-handed industry specific regulation, for which the Electronic Communications Commission should implement the framework. The appointment of a commissioner that deals directly with industry disputes concerning designated services is also new to the current regulatory regime. The proposed regulatory regime is designed to encourage industry self-management. It recommends, but does not mandate, that the industry establish a forum for that purpose. The Inquiry also proposed strengthening the Commerce Act, especially section 36 and 47. It recommends that the Kiwi Share Obligation should be better defined and embodied in legislation.

6.9 Proposed Changes to the Old Regulatory Regime

Upon receiving the report of the Telecommunications Inquiry, the government gave the following decisions concerning the recommendations of the Inquiry on 20 December 2000: It decided to appoint a Telecommunications Commissioner to act as an industry-specific regulator within the Commerce Commission. The costs of the operation will be funded by the industry. The key functions of the Commissioner will be to resolve disputes over regulated services; to report to the Minister of Communications on the desirability of regulating additional services and; to monitor and enforce Kiwi Share Obligations (KSOs). An industry forum will not be mandatory, but is expected to be established. The Commissioner can approve the code of practice for the forum. A regulated price will only be set if there is a dispute over the price that the parties cannot resolve themselves. A point should be noted: the Commissioner does not have the power to overturn commercial negotiations.

To ensure that minimum regulation is adopted, the government decided to follow the Inquiry's recommendations of a hierarchy of regulatory tools. On the top of the hierarchy are the *designated services*, i.e. services that the Commissioner requires Telecom to provide to anyone seeking access to them. Initially, such services included interconnection to Telecom's fixed telephone network, wholesaling of Telecom's fixed network services and number portability, including 0800 number portability. Telecom and the applicants (other carriers) can agree on how these services are priced, but if no agreement is reached, the Commissioner sets the prices using specific pricing rules. These rules include the "cost-based rule" (total service long-run incremental cost) and "bill and keep" for interconnection and "retail minus cost saved" for wholesale access. The

Telecommunications Commissioner or the Minister of Communications can initiate a process to add services to the list of designated services. Lower on the ladder are services the designation of which is deferred until some deadline to allow the industry to resolve the issues that are needed to be resolved without having to regulate them. The Commissioner will designate these services only if by the deadline the industry has not reached an agreement. On the bottom of the hierarchy are *specified services*, i.e. services that must be provided upon request. The disputes around these services should involve no prescribed pricing principles. No service was initially specified.

The process for resolving disputes will be as follows. In relation to a designated service where the price is in dispute, the Commissioner will apply "initial pricing principles" to make a determination on price quickly. This determination is binding and not subject to appeal to the High Court. A party could then seek a "pricing review determination". Three Commissioners from the Commerce Commission, including the Telecommunications Commissioner, will make full determination pricing reviews jointly. The determination will engage the application of the "pricing review principles" which involves more complex methodology. An appeal may be allowed on full pricing review. The rights of appeal will be limited to points of law, to co-exist with a right to judicial review.

The Telecommunications Bill 2001 was introduced by the Minister of Communications five months after these decisions were made. This legislation was designed to carry out the government's decision as its response to the Inquiry. After the first reading of the Bill, it was referred to the Commerce Select Committee (Parliament) for consideration, the Committee recommended a shorter time frame for the Commerce Commission

to make a determination or a decision and designation of fixed to mobile pre-selection from Telecom's network as a multinetwork service, etc. The government introduced Supplementary Order Papers (SOP) in November 2001 to amend the Bill in relation to the recommendations of the Committee. More services were specified in SOPs as a result. The Bill was passed a month later. Changes have been made to the Bill and therefore its contents were a bit different from the government's decisions made at the end of the year 2000.

The new regime adds a layer of industry-specific regulation to complement the generic competition regime under the Commerce Act. The regime is designed to avoid inefficient and overuse of the courts and therefore reduces the risk of having the incumbent dragging out the process.

Chapter 7

Failure of Voluntary Negotiation as Explained by the Coase Theorem

In the old regulatory regime, agreements on interconnection between the incumbent and the entrants were always difficult to achieve by voluntary negotiations. The government expected that most disagreements could be solved by commercial negotiations and the courts were the last resort which should not be used often. In reality, the old regulatory system did not work as the government expected. Negotiations could not bridge the differences between interconnection seekers and provider. They turned to the courts to solve their problems more often than the government would like. Telecom had no incentive to allow entry and Clear needed interconnection, which put Telecom in a superior bargaining position. In this chapter, the incentive for Telecom to negotiateis examined according to the Coase Theorem, to give insights into why voluntary negotiation did not work in New Zealand.

Hoffman and Spitzer (1982, p73) restated the Coase Theorem as follows: *"a change in*

a liability rule will leave the agents' production and consumption decision both unchanged and economically efficient within the following (implicit) framework: (a) two agents to each externality bargain, (b) perfect knowledge of one another's (convex) production and profit or utility functions, (c) competitive markets, (d) zero transactions costs, (e) costless court system, (f) profit-maximising producers and expected utility maximising consumers, (g) no wealth effects, (h) agents will strike mutually advantageous bargains in the absence of transactions costs". The violation of its assumptions may render the Coase Theorem not applicable in the real world.

In the old regime, the government of New Zealand practised hands-off policy in interconnection issues in the telecommunications industry. This means that the telecommunications industry is fully deregulated and all markets are open to entry. It intends to give competition the important role of regulating the market. The government only interferes when competition is under threat. The idea is that incumbent and entrants would negotiate and reach the optimal interconnection charges, which would lead to efficient outcomes. Voluntary negotiations have high priority and courts or other regulators cannot overturn the agreements reached. When the parties involved reach no consensus over interconnection issues, they may then turn to the courts for dispute resolution. However, the government preserves the right to introduce further regulatory measures such as price regulation if voluntary negotiations cannot deliver satisfactory outcomes.

Three major parties are either directly or indirectly affected by the level of interconnection charges: the incumbent, the entrants and the consumers. However, consumers cannot and/or may not be willing to take part in negotiations. The reason for consumer non-participation arises from the high transaction costs of coordination of differential

interests. Only two parties, the incumbent and the entrants, are left to negotiate for the interconnection fees. Therefore, the gain in consumer surplus of a prospective lower interconnection fee are ignored unless some entities (eg. government or consumer groups) are willing to step in to present the consumer interests.

It is clear that the government believes the efficiency proposition of the Coase Theorem: *"when parties can bargain together and settle their agreements by cooperation, their behavior will be efficient regardless of the underlying rule of law"* (Cooter and Ulen, 1988 p105). However, the government ignores the lack of incentive of the incumbent to interconnect with the entrants and thereby to allow access to the network. The lack of incentive to negotiate stems from there being no mutual gains from trade. Therefore, voluntary negotiations cannot assist in setting optimal interconnection charges. This conclusion is drawn from comparing the monopoly profits with the sum of duopoly profits in what follows.

7.1 Monopoly Game without Consumer Participation

Without the entrant (Clear), the incumbent (Telecom) enjoys monopoly profits. Assume linear demand function, $P = a - bQ$, and a constant marginal cost, c. The profit-maximising problem of the monopolist is:

$$\max_{Q_m} \pi_m = (a - bQ_m - c)Q_m \tag{7.1}$$

The value for Q that solves the problem is:

$$Q_m^* = \frac{a - c}{2b} \tag{7.2}$$

Solve for P:

$$P = a - bQ_m = \frac{a+c}{2}$$

and the profit-maximising level of profit is:

$$\pi_m^* = \frac{(a-c)^2}{4b}$$

7.2 Duopoly Game without Consumer Participation

With the new entrant (Clear), the firms play the duopoly game. Assume that each firm acts non-cooperatively with zero conjectural variation. Thus, each is on its reaction function and the equilibrium is identified as the intersection of the two reaction functions. Suppose that two firms producing a homogeneous product with constant marginal and common cost, c. The market price, P, depends on the sum of production by two firms, $Q = q_1 + q_2$. The profit of each firm, π_i, depends on its own output, q_i. The linear inverse demand function becomes $P = a - b(q_1 + q_2)$. The profit of each firm i $\epsilon\{1, 2\}$ equals maximising decision:

$$\max_{q_i} \pi_1 = [a - b(q_1 + q_2) - c]q_1 \tag{7.3}$$

The Nash equilibrium is

$$q_1^* = q_2^* = \frac{a-c}{3b}$$

The market price is:

$$P = a - bQ_m = \frac{a+2c}{3}$$

The Nash equilibrium profits are

$$\pi_1^* = \pi_2^* = \frac{(a-c)^2}{9b}$$

and the total profits is the sum of the two firms' profits:

$$\pi_c = \pi_1^* + \pi_2^* = \frac{(a-c)^2}{4.5b}$$

The graphical representation of the analysis is in figure 7.1.

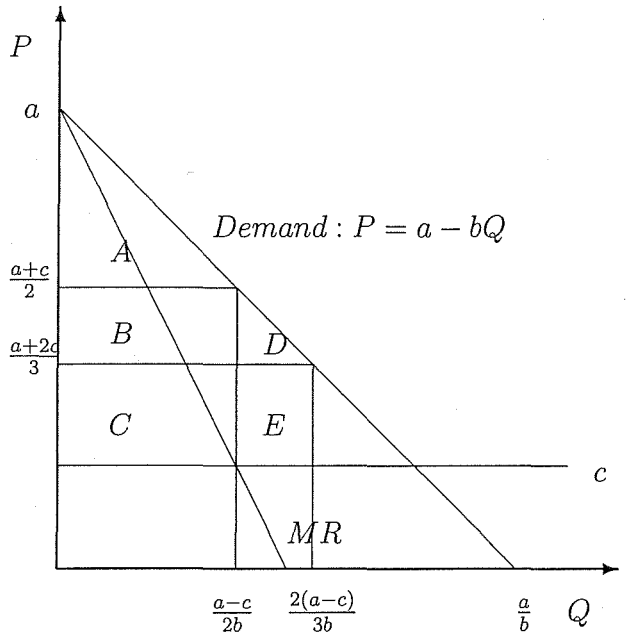


Figure 7.1: An Illustration of Incentives for Monopoly and Duopoly Market Structure

Comparing the monopoly profits (area B + C) with the duopoly profits (area C + E), it is clear that monopoly profits are greater, $\pi_m > \pi_c$. Therefore, the entrant is unable to compensate the incumbent for its loss resulting from providing interconnection. This means that the incumbent would prefer to be the only seller in the market and earn monopoly profits. It thus has an incentive to deter entry by denying and/or delaying the interconnection. This is the main reason why voluntary negotiation cannot work as efficiently as the government wishes. In this example, consumer benefits are not taken

into account in negotiation because of the significance of transactions cost. The agents therefore cannot strike mutually advantageous bargains.

Other assumptions concerning the Coase Theorem are violated in the the context of New Zealand telecommunications negotiations. The first problem is asymmetric information. Each carrier has the incentive to own private information and to use it to its own advantage at the expense of the others. Although the government requires the publication of interconnection relevant information to assist in future negotiations, asymmetries in information still persist. The production and profit functions of each operator are unknown to the others and to the regulator, this violates the perfect information criterion.

Furthermore, the incumbent has market power. The sources of the incumbent's market power are listed in Chapter 3, which may include supply side economies of scale and scope, demand side economies of scope and its vertically integrated structure, etc. The incumbent's superior market power renders the "competitive markets" criterion unachievable in nature.

In the old regulatory regime in New Zealand, if commercial negotiations could not deliver agreements, carriers could use the courts as a backstop to resolve disputes. The court dispute resolution system has proven to be both costly and time consuming. This violates the assumption of a costless court system. Relying on voluntary negotiation cannot deliver efficient outcomes in the New Zealand context. The externalities plague the negotiation process.

The government can act as a representative for consumers to internalise the positive externality. It can impose regulation or threaten to introduce stricter regulation. This

reduces the transaction costs associated with consumers' direct involvement. However, the drawbacks of such an approach are many. For example, the large administrative costs for government intervention have to be paid, for which consumer welfare is reduced. It is also controversial whether the government has the knowledge and ability to decide what is the best for consumers.

7.3 Duopoly Game with Consumer Participation

Assume that there are no transaction costs and therefore consumers can also take part in negotiations. Comparing the consumer surplus (CS) under monopoly (area A) with CS under duopoly (area A + B + D) gives: $\frac{(a-c)^2}{8b} < \frac{2(a-c)^2}{9b}$. Consumers would therefore prefer the duopoly situation. In the first model where consumers are ignored, the incumbent has no incentive to provide interconnection. It is interesting to investigate whether or not the consumers, whose CS is greater under duopoly, can bribe the incumbent to provide access willingly. The total welfare under monopoly, the monopoly profits plus the CS under monopoly, is $\frac{3(a-c)^2}{8b}$ (area A + B + C). The total welfare under duopoly, the sum of the profits of the two firms plus the CS under duopoly, is $\frac{4(a-c)^2}{9b}$ (area A + B + C + D + E). Due to the higher total welfare under duopoly, the consumers are able to compensate the incumbent for the loss of providing interconnection services. If the government can act as a mandatory in interconnection negotiations for the consumers with transaction costs that approach zero and other assumptions are more or less satisfied, the efficient outcome may be achieved by voluntary negotiations.

Chapter 8

Comparisons and Evaluation of the Two Regimes

The two regulatory regimes resulting from the first and second regulatory reform in telecommunications in New Zealand are compared. Comparisons of the two regimes are made to assist understanding of the change of setting introduced in the new regime and what problems of the old regime were targeted to be solved by these changes. Evaluation is made for both regimes. The details of the new regime have not been sorted out, therefore the evaluation is based on information that is currently available.

There are two main sections in Chapter 8. Section 8.1 compares the old and the new regulatory regimes in telecommunications in New Zealand. The comparisons section is further divided into four main aspects: institutions, governing laws, dispute resolution process, and others. The first three are the areas where the changes have been the most significant. The other issues include redefining of the Kiwi Share and the industry forum. Section 8.2 evaluates the two regimes. This section is meant to address the

problem of the old regime and to second-guess the potential problems that might plague the new regime based on the theory of regulation.

8.1 Comparisons

The second regulatory reform in telecommunications in New Zealand brought in some institutional and functional changes. The reform was aimed at improving the social and economic goals of the government. I compare the two regimes to analyse the differences of the two regimes to achieve better understanding of the goals of the New Zealand government

8.1.1 Institutions

Figure 8.1 shows the regulatory structure in New Zealand before and after the second reform. The dashed lines and square display settings of institutions or processes that were not in place prior to the reform. The New Zealand parliament passed legislation such as the Commerce Act and the Telecommunications Act that govern the industry. The Minister of Communications reports to the Parliament on his/her administrative performance. The Commerce Commission takes up an enforcement role in the regulatory system. It acts to ensure the compliance of the Commerce Act and the Fair Trading Act by the industry. The Ministry of Economic Development provides policy advice to the Minister of Communications. The independent judiciary provides the operators with another channel to go against the judgements of the regulatory chain, which consists of government departments and crown entity. The respective competencies and the change of responsibility of the three main regulatory institutions in New Zealand – Ministry of

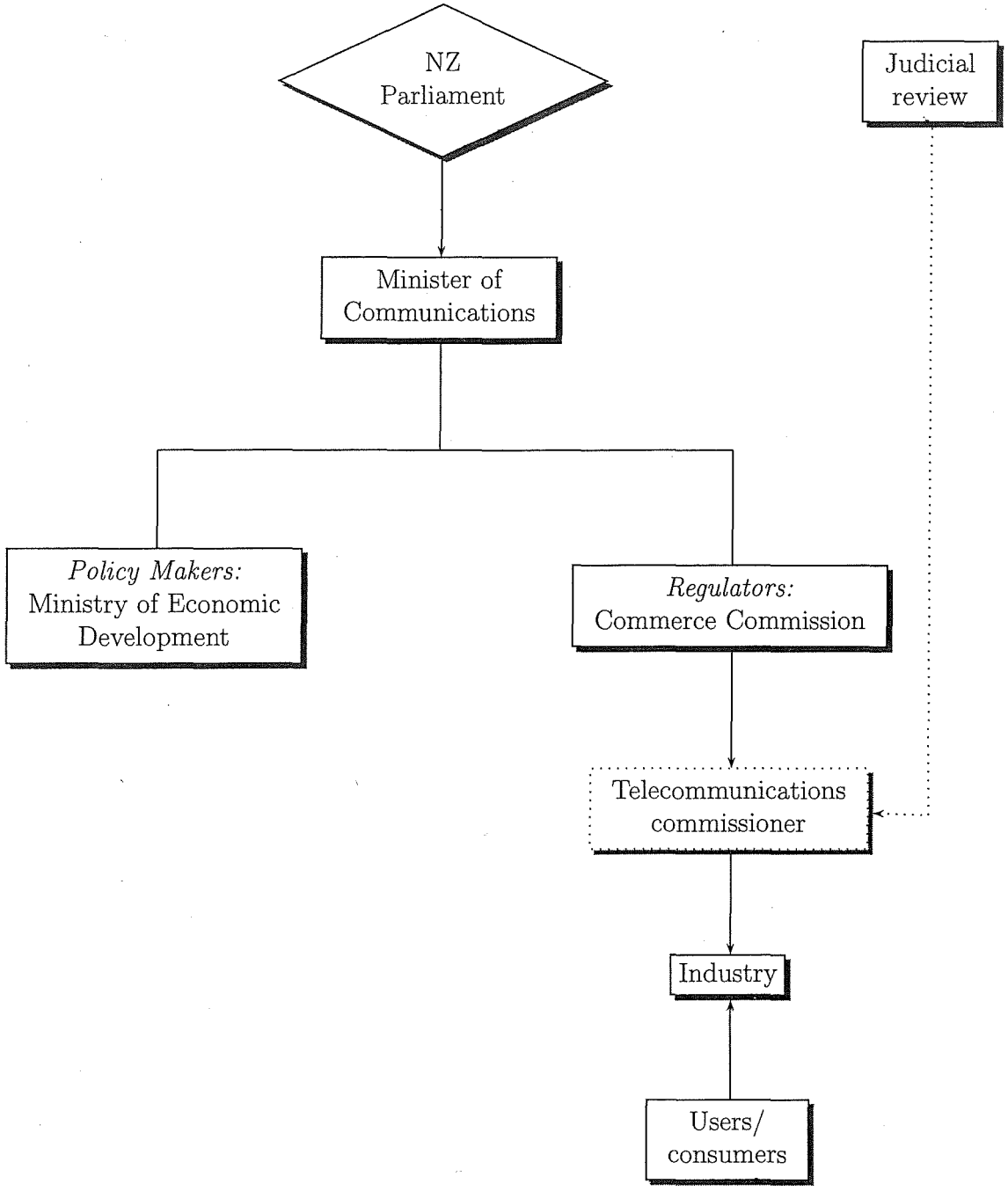


Figure 8.1: New Zealand regulatory structure. Source: APEC Regulatory Outlook

Economic Development, Commerce Commission, and courts are outlined below.

The Ministry of Economic Development can be seen as the policymaker in the New Zealand regulatory regime either before or after the second reform. It is responsible for the provision of policy advice to the Minister of Communications on the social and economic goals of the government in the telecommunications sector. The Minister of Communications is a member of the Cabinet, and he/she is a part of the collective decision making process of the government. He/she is also responsible for the progress of industry relevant legislation through Parliament. Competencies of the Ministry of Economic Development did not change after the reform.

The New Zealand Commerce Commission is the regulator in the New Zealand regulatory regime. It administers general competition law to ensure competitive environments. The Commission regulates competition issues arising in all sectors including the communications sector as there is no sector-specific regulatory agency in New Zealand. The Commission consist of one chairman and five commissioners. Under the Telecommunications Act 2001, a Telecommunications Commissioner is appointed within the Commission. The activities of the Telecommunications Commissioner are funded by the industry. He/she has access to specialist staff to assist him/her with more technical issues. The major responsibilities of a Telecommunications Commissioner cover the following three aspects. For a start, he/she has to resolve disputes over the regulated services. The services which have been regulated at the beginning of the new regime are of crucial importance to competition. In the new regime, the Telecommunications Commissioner takes over a large proportion of dispute resolution burdens from the courts to reduce the misuse of courts. The second key function of the Telecommunications Com-

missioner is to report to the Minister of Communications on the desirability of regulating additional services. Another key function of the Telecommunications Commissioner is to monitor and enforce Kiwi Share Obligation, which includes the administration of the funding payments from the industry and the quality of the universal service. In the new regime, more tasks are entrusted to the Commerce Commission.

In the old regime, courts were heavily relied upon for dispute resolution. This was against the government's intention of minimising the use of regulatory institutions. Matters involving the prices or the terms and conditions of interconnection were seldom settled by commercial negotiations. The numerous litigations among operators created tension in the industry. Therefore, in the new regime, the use of courts is limited. Appeals against decisions of the Commerce Commission are restricted to matters of administrative law/administrative review, rather than decisions of the Commission. The same is expected to apply with decisions of the Telecommunications Commissioner. Determinations of the Commissioner on regulated services are subject to appeal on questions of law (and questions of fact) in limited circumstances. The new regime shifts the decision making responsibility of regulated services that are in dispute to the Commerce Commission. Therefore, disputes over regulated services are no longer under the charge of the courts.

8.1.2 Governing Laws

The most important law that governs the conduct of operators in the telecommunications industry is the Commerce Act 1986. This generic law has been applied in many cases to prevent anticompetitive behaviour of the market participants. In the

second reform, the Commerce Act was strengthened to give the Commerce Commission more teeth and to bring New Zealand in line with Australia. A larger number of firms and markets would therefore come under the jurisdiction of the Act. The maximum penalty for offences in terms of breaching the Commerce Act by body corporate has been doubled to encourage operators to act in accordance with the Act.

The Telecommunications Act 1987 removed restrictions on the supply of telecommunication equipment and services to implement the full deregulation policy of the government. The Telecommunications Act 2001 was legislated to introduce further regulatory measures. These measures include the appointment of a Telecommunications Commissioner, the designation and specification of certain services and the clarification of the Kiwi Share Obligation. The time frames and procedures that the Telecommunications Commissioner must adhere to when making a decision or a determination were outlined in the 2001 Act as well. Although the 2001 Act has been enacted, the 1987 Act remains in place. However, the new Act includes certain provisions of the 1987 Act, particularly those relating to the registration and operation as a network operator.

8.1.3 Dispute Resolution

In both regimes, industry participants are encouraged to determine their own terms of supply via negotiations. Parties may only seek determination from the Commissioner in relation to a designated or specified service if they have negotiated the term of supply for these services with reasonable effort. The determinations of the Telecommunications Commissioner do not have the power to overturn commercial agreements.

Compared with the old regime, the new regime provides greater incentives for net-

work service providers, especially the incumbent, to engage in serious negotiations. In the old regime, when commercial negotiations failed, parties involved could sue the other for breaching the law (normally, it is the entrants who sued the incumbent). It has been proven by past history that it was very difficult to judge the defendant guilty when the Commerce Act did not specify the range of activities that were considered offensive especially when the information was not perfect. This situation could be worked to the incumbent's benefit. If the misuse of the incumbent's market power went unpunished, the actions of the incumbent could be led by false incentives. More anticompetitive business practices could be adopted as a result.

In the new regime, however, if the incumbent is being deliberately difficult in negotiation over regulated services, the other party can seek help from the Commissioner, who is a specialist in the industry. The Commissioner would adhere to certain prescribed rules in making a determination. Judging by the government's choice over the prescribed pricing rule in interconnection, the entrants were favoured under the new regime for more intense competition.

8.1.4 Others

Kiwi Share is a contractual agreement between the Crown and Telecom that enables the government to meet its social objectives in telecommunications. Under the original Kiwi Share, Telecom has to maintain a free calling option for ordinary residential telephone service, charge no more than the standard residential rental for ordinary residential telephone service and continue to make ordinary residential telephone service as widely available as at 1 November 1989. The original Kiwi Share was implemented

over a decade ago. At that time, the use of personal computer was not as common as it is now, and therefore internet services were not included. Nowadays, access to data service is important for a knowledge economy, and therefore the Kiwi Share has to be upgraded to ensure access to the Internet service. The enhancements to the Kiwi Share will assist the delivery of the government's objective – to benefit more consumers. The upgraded Kiwi Share requirements include the following. The new, clarified definition of local calls include standard calls to the Internet as well as fax calls. Telecom was asked to extend its network coverage to current levels. Telecom has to upgrade its network in order to bring basic Internet access to virtually all New Zealanders. Telecom is also required to meet detailed service quality measures and to report to the Crown and the Telecommunications Commissioner. The agreements do not require Telecom to offer free of charge new types of Internet call traffic that might emerge based on new Internet capacity. This may cause problems in the future as to the proper definition of free local calls.

It was decided that an industry forum will not be mandatory. However, the government expects one to be established. Many major network service operators in New Zealand have expressed their willingness to join the forum. The Telecommunications Commissioner can approve codes of practices for the forum.

8.2 Evaluation

The New Zealand regulatory regime appears to be technology neutral and seems to avoid impeding the introduction of and access to new services and technologies. The regulation in New Zealand aims at prevention, not intervention. This is the idea of "as

much market as possible and as much as government as necessary". The emphasis of such a light-handed approach is on establishing a policy and regulatory environment that is sufficiently flexible to meet new issues that might emerge from the fast-changing environment of the telecommunications industry.

Compared with other countries, the New Zealand telecommunication industry has been under-regulated with its full deregulation policy. Under this regulatory environment, the entrants have had to fight a bitter battle with the incumbent for a market share. Although New Zealand telecommunications industry has performed well regarding price reduction, ongoing investments and improved services, the government believe that better performance could be achieved with fiercer competition. The ineffectiveness of the competition implied further regulatory measures should be considered. The area that caused greatest discontent in the old regime was the way disputes were settled. When commercial negotiations failed, cases were often taken to the courts. Courts are not considered appropriate regulators when right or false was not the only issue involved. Judgements from the courts may ignore the economic consequences they cause and the government's policy goals. Therefore, the courts cannot provide a planned policy for the development of the industry.

Recognising problems of the old regime, the government mandated a telecommunications inquiry to prepare for the second regulatory reform. In the new regime, the dispute resolution function of the courts over regulated services is largely replaced by a Telecommunications Commissioner. The Telecommunications Commissioner has to be a specialist with good knowledge of the industry and regulation. It is believed that an expert of the industry would be in a more appropriate position than the courts to make

decisions on matters in dispute. The government's policy regarding competition and its social goals can be implemented through the actions of the Commissioner.

The time frames for making a determination were set to prevent unnecessary delays. A determination is binding during judicial review to prevent the misuse of the courts. The Telecommunications Commissioner makes decisions or determinations alone or involves two other Commissioners in the Commerce Commission. This provides an opportunity for peer review and a pool of expertise over important issues. However, does such arrangement guarantee the delivery of consistent determinations? When three commissioners have different opinions over an issue, who has the right of the final verdict? Does the regulator have to justify his/her decision to parties seeking determination from the Commissioner? Should the quality of the Telecommunications Commissioner's performance be assessed? If yes, how is this done?

Determinations over regulated services have to be consistent to assist the industry in forming expectations. This will help to reduce uncertainty surrounding the industry and thus will assist in making timely investment decisions. The consistency needs to be secured even with the change of a Telecommunications Commissioner and when making determinations among commissioners. It is not clear yet who has the superior determination power when three commissioners are in disagreement on issues over a regulated service. Do their opinions have the same weights? If the Telecommunications Commissioner is given superior power, will the choice of person to fill the role of Telecommunications Commissioner affect the regulatory and industry policy? The Telecommunications Commissioner serves a five year term of office, and the contract is terminated if he or she does not perform his/her tasks. The procedures of assessment

for his/her performance quality have not been established.

The government has decided on a set of prescribed pricing rules of interconnection when the price is in dispute. These prescribed pricing rules are cost-oriented and are better for the entrants than the incumbent. It might be a worry if the entrants were not cooperating in negotiations in order to push for a determination from the Telecommunications Commissioner since the prescribe pricing rules may lead to a determination that favours the entrants. However, a similar worry would arise if the determination favoured the incumbent.

The Commerce Commission is currently seeking submissions from interest parties and industry experts. Many details of the new regime are not yet clear. Therefore the evaluation is not complete. However, judging from the changes that are known to the public, I would expect it to work better than the old regime especially with its ability to increase competition.

Chapter 9

Conclusion

This thesis addresses issues of regulation of the telecommunications industry. Regulation is the rule-of-the-game which all industry players have to follow. Players who violate the rule are punished for their misconduct. The rule-of-the-game is, therefore, of crucial importance to the distribution of power between players and the form and extent of competition. Competition can have great influence on productive efficiency and consumer welfare. Therefore, the way these rules are set affects the success of competition and the achievement in economic efficiency.

The Telecommunications market has expanded rapidly in recent years. It plays an important role in the economy of many developing and developed countries. The growing importance of this industry has attracted attention from governments. The basic idea underlying government intervention through regulation is to provide an environment that is appropriate for the development of effective competition. The benefits of introducing competition into the telecommunications industry have been proven by many single or cross country studies. Governments would like to ensure that competi-

of international organisations. The OECD and APEC have undertaken many studies of regulation and telecommunications services performance in recent years in answer to the requests of their member countries. These studies have shed some light on the choice of regulatory measure that generally delivers good telecommunications performance. The second problem is that indices constructed to represent regulatory regimes may not be objective and controversies arise as a result. The way indices were chosen and constructed may affect the analysis and lead to different conclusions.

Nevertheless, there is no doubt about the positive link connecting the removal of legal barriers to entry and the telecommunications performance. Countries who opened up their telecommunications industry for competition in the 1980s and 1990s have enjoyed outstanding telecommunications performance compared to those countries who are just starting to open or have not yet opened their markets for competition. Most of the early movers have chosen not to maintain heavy regulation at the same time. The relatively light regulation of the most liberalised country group is characterised by fewer legal limitations on the number of competitors allowed in the market, low state shareholdings of the PTO's share and special voting rights, higher privatisation of major PTO's and fewer restrictions on the number of foreign operators in the domestic market.

Competition has not been effective in New Zealand under the old regulatory regime. The government of New Zealand believes that consumers would benefit more if competition can be intensified. The regulatory experiments over the past decade suggest that regulation in New Zealand might be too light. There are not enough restrictive measures in place to properly constrain the behaviour of market participants. The voluntary negotiations did not work as effectively as envisaged by the government. The

incumbent was able to delay or deter entry with lengthy litigations. This fact justified the second regulatory reform in New Zealand.

The second regulatory reform in New Zealand attempted to change the operators' incentive to negotiate especially over regulated services. Under the new regime, a Telecommunications Commissioner was appointed to resolve disputes concerning regulated services. The choice of services to be regulated are based on their importance to competition. The government can, therefore, ensure that the delay in introducing these services, owing to the fact that no agreements are reached between operators, can be eliminated within a reasonable time period. It is interesting to observe the shifts in regulatory power from the courts to the Commerce Commission. This change, however, should be welcomed by operators other than the incumbent.

How much power a Telecommunications Commissioner has is not yet clear to me. What are the prescribed rules a Telecommunications Commissioner has to follow or apply while making a determination? Issues such as accountability, due process and the expertise of the Telecommunications Commissioner become important under the new regime. They are important because the monitorer of the industry may need to be monitored while his/her decisions may have significant effects on the market. This is not to say that the government should constantly supervise the performance of the Telecommunications Commissioner. What I mean is that a procedure has to be established for assessment to avoid the principal-agent problem.

The evaluation of the new regime can be expanded once the details of the way this regime works are established. Sorting out all these details, however, may take several years. Clear has expressed interest in applying determinations from the Telecommu-

nications Commissioner on matters related to interconnection with Telecom's network. However, the newly appointed Telecommunications Commissioner will not be in New Zealand until March 2002. I would hope that this case can give us ideas of how this new system functions. If pricing is in dispute, what would the Telecommunications Commissioner do in terms of choosing pricing principles? Observations obtained from cases that require the attention of the Telecommunications Commissioner can enrich the practical aspects of the evaluation of the new regime. I would also like to verify whether or not under the new regime voluntary negotiation works better than under the old regime in achieving agreements given more time.

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